The Builder.

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The Management of Heat.

THIS season of the year, when winter is waiting ready crowned and robed, doubtlessly, in some arctic region, for the day of his reign to begin, the subject of artificial heat must be one to which most of our readers will turn with hearty approval. What ice is to us in the height of summer, so is heat in the depth of winter. By the use of both we can mitigate the effects of the extremes of the opposite seasons. But summer, with her train of honeysuckles and roses, not to say watering-carts, having turned her back upon us for the present year, there is no probability of our attention being distracted from the best means of modifying the severities of winter. We are glad, therefore, to notice a practical treatise by Mr. Box, in which he has aimed to apply the laws of heat to the useful arts. Among the latter he has very properly included the art of heating and ventilating churches, chapels, all public buildings, and houses.*

Beginning with an explanation of the general principles and facts touching heat, Mr. Box proceeds to treat, successively, of combustion, steam-boilers, the efflux of air, chimneys, vapours, evaporation, distillation, drying, heating liquids, heating air, the transmission of heat, and laws of cooling, leaving ventilation and heating of buildings, and the effects of wind on ventilation, to the last. Reversing this order, in the interest of our readers, we will give some account of our author's theory of heating and ventilation first.

Before reckoning how much heat is required for a building there are several things we must know. One is, how much is expended. Our author divides the heat lost by buildings into four portions; or that lost by the floor, the ceiling, the walls, and the windows. The heat lost by the floor is not considerable, because the earth, at a depth of 20 ft., has the same temperature as that of the yearly mean of the air at any place; nor is the loss by the ceiling great if it is an ordinary lath-and-plaster ceiling protected by the further covering of the roof from cooling influences, though, if the roof is an open-timbered one, without a ceiling, the loss must be great. The walls are a more serious item of consideration. He states the case of a room with brick walls and no windows exposed on every side to cooling influences, with an internal temperature of 60°, while that of the external air is 30°, and goes through an intricate calculation to arrive at the temperature of the surfaces of the walls and the quantity of heat transmitted from one to the other, in three formulæ. Should any one want to know the loss of heat sustained by the wall of a furnace with the fire on one side of it and a low external temperature on the other, he would have to seek the solution of the difficulty by similar means. Then, again, Mr. Box gives the case of a room forming part of a large building in which only one side of it is exposed to the external air and radiant objects, and the formula for working out the amount of loss. The loss of heat in units per square foot per hour by brick and stone walls, 40 ft. high, in buildings where only one face is exposed, and for 1° difference of internal and external temperature, is shown by him in this manner:—

Brickwork.				Stone.	
Thickness.			U.	Thickness.	U.
Brick.		Inches.		Inches.	
½	=	4½	·371	6	·453
1	=	9	·275	12	·379
1½	=	14	·213	18	·324
2	=	18	·182	24	·284
3	=	27	·136	30	·257
4	=	36	·108	36	·228

The loss of heat by glass in windows requires further calculation. As a specimen of the system pursued by Mr. Box, we will quote the case he gives of a window in which the interior walls and internal air in contact with the glass have one and the same temperature of 60°, and the external air and radiant objects one of 30°.

"The glass being heated on one side and cooled on the other by similar influences, will have a temperature in the centre of its thickness a mean between the two, or in our case $t'' = \frac{60 + 30}{2} = 45°$, and with thin glass we may assume that it has this temperature throughout. We may calculate the amount of heat received from within and dissipated without by the Rule $U = Q \times (T - t'')$. For glass the value of R is, by Table 71, ·5943, and the value of A by Table 74, for a window, say 5 ft. high, is ·4655; therefore $Q = ·5948 + ·4655 = 1·603$, and in our case the loss is $1·0603 + (60° - 45) = 15·9$ units per square foot per hour for 30° difference of internal and external temperature, or $\frac{15·9}{30} = ·53$ unit for 1°, by a window 5 ft. high; for 10 ft. and 20 ft. the losses are ·515 and ·504 respectively."

Besides having to make up for the heat lost in absorption and radiation, before being in a position to calculate the degree of artificial heating required for a building to be pleasant and healthy, we must consider the heat evolved by respiration of the occupants, among other matters. It is agreed that an ordinary man gives out ·022 lb. of carbon per hour, which develops a heat of $12906 \times ·022 = 284$ units per hour. Some portion of this heat, however, is absorbed by the vapour formed during respiration, and some is dissipated by radiation to the surrounding objects, and by the contact of cold air; otherwise this amount of heat would be sufficient to set ventilation in motion. The quantity of air required by an ordinary man for his twenty respirations per minute, which are reckoned at 40 cubic inches each, is $\frac{20 \times 40 \times 60}{1728}$ = 28 cubic feet per hour. Taking into consideration the vapour emitted by him, which would saturate a small allowance of air with too much moisture to be healthy, he requires per hour the capacity of a cube 6 × 6 × 6 ft. For prisons, workhouses, &c., Mr. Box adds, it should not be less than 350 cubic feet, and for hospitals 1,000 cubic feet, per hour per head. This necessity involves a constant change of air to form part of all schemes of artificial heating. Our author is scarcely aware of the continuous efforts of the more advanced sanitary reformers among architects to ensure due provision for ventilation and heating in buildings, for he writes,—"The acknowledged difficulties of accomplishing effective ventilation have led to the whole question being virtually abandoned by architects and others designing our public and private buildings." Practising a little more perseverance himself—at least in theory—he gives three or four schemes for ventilating rooms, none of which have any great novelty, but all of which are marked by a minute attention to the workings of natural laws. Upwards of a hundred little careful diagrams illustrate his statements. We will follow him through three cases he describes at length to exhibit three different plans. The first is a school for 100 boys warmed and ventilated by a certain stove; the second a chapel heated by hot-water pipes and ventilated by a compressing-fan, driven by a weight wound up by manual labour during the preceding week; and the third is a hospital, heated by hot air pipes and ventilated by a draught-chimney, in which a fire is maintained all the year round.

We must premise that the first of these schemes is ascribed to Péclet, to whose work, "Traité de la Chaleur," our author frequently refers. The stove is placed at one end of the school-room and the chimney at the other; and both the stove and the long pipe, which extends from one to the other, are constructed with a double case, the inner space containing the fire and smoke and the outer one heated air. This case is furnished with openings, through which the highly-heated air from within is forced into the room. If there were openings at the top of the room this heat would pass through them and be wasted: so to prevent this the openings for ventilation are made about 18 in. or 2 ft. from the ground, to which level the warm air descends. Mr. Box contends that the air is distributed by these means all over the room in horizontal layers, which become cooler as they descend to give out heat to the walls. In the summer, when the stove is not heated, the ventilation is accomplished by means of a small special fire at the base of the chimney and a large register opening high above the heads of the scholars. In the winter, the stove should be lighted an hour or two before the boys assemble, because, although, as our author says, each individual emits heat enough to furnish that required for ventilation, the walls and air require warming. To give a specimen of the author's minute calculations we quote his measurement of the heat dissipated by the walls:—

"The building exposes an area of 210 square feet in windows, and 1,340 square feet of 14-in. walls: assuming for the air an internal temperature of 60° and external 30°, the loss by the windows will be 12·3 units per square foot, and in our case $12·3 \times 210 = 2583$ units per hour, and the walls (Table 78) will lose $1340 \times ·159 \times 30° = 6400$ units, giving a total of 8983 units per hour lost by the building after it has been heated to the standard temperature. But a great amount of heat must be absorbed by the walls before they can be brought up to that standard; by (282) and Fig. 80, we see that with 14-in. walls, and air at 60° and 30°, the mean temperature of the wall is $\frac{48·02° + 34·2°}{2}$ = 41·11°, or say 41°; they have therefore to be heated in the morning from 30° to 41°, or 11°; and as they contain about 1570 cubic feet, weighing by Table 46 = 115 lb. per cubic foot, and the specific heat of brickwork (burnt clay) being ·185 by Table 1, they will require $1570 \times 11 \times ·185 = 367,420$ units of heat to raise their temperature from 30° to 41°. In our case they will receive it from two sources, from the heated air in the room and by direct radiation from the stove and stove-pipe. The amount that can be received by contact of air is at first, when the walls are cold, or at 30°, by (272) and Table 74 = $·435 \times 30 = 13·05$ units per square foot; but at the end of the operations, when the walls are heated to their standard internal temperature of 48° we have only $·435 \times (60 - 48) = 5·22$ units; the mean is $\frac{13·05 + 5·22}{2} = 9·14$ units per square foot per hour."

We must explain that the tables referred to form an important feature in the work, and present in a cut-and-dried form the result of many a careful and lengthy experiment. Our author next calculates the time required to heat the walls and cool down the building, the area of inlet and outlet openings, the quantity of fuel required, &c. We must pass on, however, to notice the more general features of the next scheme. This is the case of the chapel, which is destined to accommodate 400 persons on one day in the week, and to be abandoned to cooling influences for the other six. The first thing required of the hot-water heating apparatus is that it should heat the walls before the building is occupied, and the next, that it should heat the requisite amount of air for the congregation during the hours of worship. The size of the apparatus should be

* A Practical Treatise on Heat, as applied to the Useful Arts, for the use of Engineers, Architects, &c. By Thomas Box. London: E. & F. N. Spon, 48, Charing-cross. 1868.

determined by the greater of these two conditions. Mr. Box goes into a calculation which gives 47,816 units of heat as the amount required for heating 220 cubic feet of air per head per hour, and 46,983, as the amount of units of heat absorbed by the walls, and then he settles the dimensions of an *enclosed* pipe, 3 in. in diameter, according to a table furnished by him. Some 214 ft. of pipes are carried by rollers, supported on cross-beams, built into the brick side-walls of channels, and a boiler of the common horseshoe form is placed below the level of the chapel floor. To yield the required amount of heat, 12 lb. of coal per hour must be furnished. After calculating the time required for heating the apparatus and the walls, and the time consumed in reducing these to the external temperature, Mr. Box advances a recommendation that will be echoed by most persons having authority in the matter of church-heating. He draws attention to the division of the 168 hours of the week. Fifty are spent in getting up the temperature, 14 in maintaining it during the hours of worship, and 104 in cooling down again. The weekly consumption of coals by this method would be 6 cwt. A small increase upon this would maintain the temperature throughout the week. This latter management is that recommended by Mr. Box. He says that the economy of regular and slow firing would be so considerable that the consumption of coal for the whole week would be not more than 7½ cwt., or 1½ cwt. more than the quantity used for the intermittent firing; and to set off against this small extra outlay would be the accommodation of finding the chapel always ready for any occasional or periodical service in the course of the week. He gives diagrams of the fan used for ventilation, with its gearing and framing. To this fan he allows a velocity of 5 ft. per second. As an ordinary man can raise 3,000 foot-pounds per minute by a winch, he calculates that the necessary weight of 18 cwt. could be raised in 19 minutes. To this plan there is the objection of the periodical winding up of the fan required, should the continuous firing be preferred to the intermittent. The destination of the air moved by the fan is a space below the floor of the boiler-house, whence, branching right and left, it enters and proceeds along the channels in which the hot-water pipes are laid, from which branch channels conduct it under the pew-seats, where it is discharged through apertures made for the purpose. A wooden casing must cover the hot-water pipes, recommends our author, and the total area of the 1¼-in. diameter holes by which the air is admitted must be equal to the area of the two main channels, or 5 square feet. With his ordinary minuteness, he lays down that, with ·8 for co-efficient of contraction, the area of 1¼ is $1{\cdot}22 \times {\cdot}8 = {\cdot}976$; and we should require $\frac{730}{976} = 740$ holes, which, distributed on a length of 214 ft., or 2,568 in., would be $\frac{2568}{740} = 3\frac{1}{2}$ in., centre to centre.

We turn now to Mr. Box's scheme for heating and ventilating hospitals. He justly observes that the ventilation of a hospital should be more perfect, powerful, and uniform than that of any other building, on account of the diseased condition of the inmates. A first necessity is that the walls should be warm. He gives a plan and longitudinal section of a small hospital or quadrangular wing of a large one, three stories high. This is heated by a cockle or hot-air stove placed at one end of it, and ventilated by a draught chimney. The hot-air apparatus consists of a collection of pipes, open at both ends, and built into the side walls, and retained in position by clamp-plates and bolts. A furnace at one angle causes fire to circulate among the pipes on its road to the chimney at its most distant angle. The external air enters the pipes heated in this manner, and leaves them in a chamber inside the wall, from which it proceeds down two channels which extend the length of the building. The upper stories are heated by other channels in the walls up which the hot-air passes and descends again to the basement, warming the walls in its progress. From these perpendicular channels branch pipes are laid on each floor, which discharge the hot-air into additional channels furnished with openings into the rooms under each bed. Foul-air channels, into which orifices open near the ceiling, carry off the vitiated atmosphere and conduct it to the end of the building occupied by the apparatus, where it enters descending shafts communicating with the chimney. It must be understood that the air entering the walls must be of a much higher temperature than that required for the rooms, otherwise when the walls have absorbed their portion of the heat it will be insufficient for the purpose of heating the room. The loss of heat by the walls, windows, &c., is duly calculated in this as in the other instances.

Allowing 1,000 cubic feet of air per head per hour, and that we have 50 × 3 = 150 inmates, we shall require 150,000 cubic feet of air at 60°, or ·76 × 150,000 = 11,400 lb. of air per hour. If we assume that the interior surface of the walls is at 60°, with a thickness of 2 ft. 3 in., we shall have by the formula—

$$U = \frac{Q \times (t - T')}{1 + Q\frac{E}{O}}, \text{ or in our case } \frac{1{\cdot}134 \times (60-30)}{1 + (1{\cdot}134) \times \frac{27}{4{\cdot}83}} = 4{\cdot}63$$

units per square foot per hour, and as we have 11,790 square feet of wall surface (windows excepted), the heat dissipated by them will be 11,790 × 4·63 × 54,567 units of heat per hour. This heat has to be supplied by the 11,400 lb. of air entering the building; and to do that it must be cooled $\frac{54,567}{11,400 \times {\cdot}238} = 20°$, and as it leaves the walls to enter the rooms at 60°, it must enter them at 80°. The *mean* temerature of the air in the walls is thus $\frac{60 \times 80}{2} = 70°$, and the internal surface would be rather more than 60°, as we assumed. The windows contain 1,440 square feet of surface, and will dissipate 1,440 × ·53 × 30° = 22,896 units per hour, the greater part of which will have to be supplied by the air in the rooms."

The number of units of heat required to be furnished by the cockle or air stove is 135,660, to produce which 23 lb. of coal per hour are consumed. In summer a fire must be maintained for the especial purpose of the ventilating apparatus in a furnace at the base of the chimney, which is so contrived as to feed upon the foul air entering the chimney. In winter the waste heat from the cockle is used, and consequently no additional cost incurred.

Mr. Box gives some French examples of heating and ventilation, and states the relative expense of the mechanical and heated chimney plans. The great Prison Mazas, in Paris, is one of the examples chosen; the prison of Provins another; and the Church of St. Roch a third. We cannot do better than refer our readers to his work for the numerous and precise particulars noted. Another point of value discussed by our author is the influence of the wind upon ventilation. He gives a table of the force and velocity of the wind, showing the amount of pressure per square foot, according to the character of the wind, and another showing the relative power of wind-vanes with single and double blades. He calculates the force necessary to overturn a chimney 80 ft. high, taking into account the two forces that resist the wind, the weight of the mass, and the cohesion of the mortar. The process is as simple as possible, and yet it is one that would not occur to everyone. The brickwork is measured to contain 1,747 cubic feet, and then weighed according to a table which gives 115 lb. per foot, when a weight of 200,000 lb. is ascertained. The cohesion of good mortar fourteen years old is set down at 60 lb. per square inch, or 5,265 × 60 = 315,900 lb., or a total weight of the chimney of 200,000 + 315,900 = 515,900 lb. To overturn this mass a force of 110 lb. per square foot would be required, a pressure of wind that is happily not generally known in this country. Mr. Box explains:—

"If the materials were incapable of crushing, the chimney would turn on that edge of its base remote from the wind, but in truth that point would be somewhere between the centre and the edge, and the chimney would resist fracture, partly by the crushing strain and partly by the cohesion assisted by the weight. By analogy with other materials broken transversely, we know that the result is very nearly the same as if the neutral axis coincided with the edge, and the force of cohesion only came into play. Admitting this, the force of 515,900 lb. acts with a leverage equal to half the diameter of the base, or 40·5 in. The centre of effort of the wind is at the centre of gravity of the surface exposed to it. The easiest way of finding the centre of gravity in our case is by *cutting out* an outline of the chimney on drawing-paper, &c., of equable thickness, and balancing it on the point of a needle. We thus find the centre of effort in our case to be 36 ft., or 432 in. above the base, and the surface area of one side of the chimney being 440 square feet, the force of the wind that would overturn it would be $\frac{515,900 \times 40{\cdot}5}{432 \times 440} = 110$ lb."

Many writers have treated of the laws of heat, but few have so uniformly applied them to the purposes of the useful arts. All the observations and calculations of Mr. Box have a practical aim. Unlike the ignorant stoker he describes, who delights in a roaring fire and sharp draught, unconscious of the loss of fuel, he is always striving after the utilization of our resources. A quiet perusal of his work will help to unravel many knotty points in the minds of those who are thinking over schemes of heating and ventilation. All owners, besides tenders, of furnaces, steam-boilers, and stoves used in the different arts, will find, too, matter of moment in his pages. For instance, he states we may obtain nearly the whole of the heat which any fuel contains by having a long flue, or pipe conveying the products of combustion from a stove to the outer air, subject to the length of the pipe, and the material of which it is composed; whereas from an open fire in a room only the radiant heat is used, the rest being wasted in passing off up the chimney; and he gives the kinds of materials proper for the pipes, and the amount of heat dissipated. One of his tablets gives the radiating and absorbing power of many bodies, such as different metals, woods, stones, saw-dust, paper, oil, calico, woollen stuffs, &c. He recommends that all pipes to steam-engines should be covered, as the loss of heat by naked pipes is very considerable. A saving of 84-horse power in a 4-in. pipe, 100 ft. long, may be effected by casing it in woollen felt, or any other bad conductor. Such scientific economy as this is well worth study. As warning, we must point out that a casing made of a good conductor, will only increase the loss. Some people think that whitewashing pipes reduces the loss; but this is not so, except to an inconsiderable degree; although the use of tinned iron, or common tin plate, is found to reduce the loss to one half.

We have already said our author devotes a chapter to chimneys. Round chimneys and square chimneys are both discussed, and their respective merits stated. The velocity of discharge is the same with both, he concludes, but the horse-power of the latter is the greater in the simple proportion of the areas of a square to the circle. A chimney 60 ft. high and 2 ft. 9 in. square, with a flue 100 ft. long, is equal to 100 horse-power, he tells us; and if we would increase its power we must decrease the length of the flue, for to double the length of it would be to reduce its power one-half. In the construction of such chimneys hoop-iron should be built into the ordinary stock brickwork at every few courses to form a bond; while in chimneys of reverberatory furnaces, in which the air rises to a temperature of 2,250°, there should be a lining of fire-brick, and wrought-iron bands placed at regular intervals outside. Tables of the draught power of chimneys under different circumstances complete the measure of information on this subject. There are few engaged in manufactures or the arts of construction on whom Mr. Box's work is not likely to confer a wrinkle. To the general student it will prove a valuable assistant.

PUBLIC HEALTH DURING THE LATE SUMMER.

As surely as the frost and cold winds of winter cause an excess of death through the fatality of affections of the lungs, so does the heat of summer produce the same effect through annual visitations of diarrhœa, with mild forms of cholera and dysentery, the mortality from which, in tropical and but half-cultivated countries, assumes such terrible proportions. The deaths from those diseases which are in a great measure incidental to variations in climate and temperature occur in much higher proportions in towns than in rural districts, and their greatest fatality is confined to the labouring classes, whose poverty, ignorance, and habitual carelessness of the simplest precautions, render them liable to, nay almost invite, attack. Mortality from disease is but one of the evil consequences of the condition in which millions of our poorer fellow-creatures exist, a condition which it is the object of social science to ameliorate.

The unusual heat of last summer produced, as we are all now pretty well aware, a mortality considerably in excess of the average of summer seasons. The Registrar-General, in his quarterly return for the three months ending 30th September last, tells us that the annual death-rate in England and Wales in the quarter was 23·9 per 1,000 persons living, which was 3·7 per 1,000 in excess of the average rate in the corresponding quarters of the ten years 1858-67. This average rate is 20·2, and, if it had not been exceeded, 20,958 persons would have survived, who fell victims to the excessive death-rate. The highest rate in those ten years was 21·8 in 1866, when cholera was in some places epidemic, and we must turn back as far as 1854 before we find a rate so high as that which prevailed last quarter; the rate in the third quarter of 1854 was 24·3,

caused by the deaths from cholera, which was then merely epidemic.

In town districts the average annual summer death-rate is 22 per 1,000, while in rural districts it does not exceed 17; last quarter it was 26·5 in the towns, and 20·4 in the country. The greatest excess of deaths was shown in some of the largest towns, the death-rate exceeding 35 per 1,000 in Manchester and Salford, Walsall, and Wigan, while in very many of them it ranged between 30 and 35. In the fourteen large towns of the United Kingdom furnishing weekly returns, the death-rate in the thirteen weeks ending the 26th of September last was 27·6 per 1,000, against 29·2 and 23·7 in the corresponding thirteen weeks of 1866 and 1867. Ranged in order from the lowest, the rates of mortality prevailing during last quarter in each of these towns were: — Bristol, 21·8; Dublin, 23·4; London, 24·6; Edinburgh, 26·3; Newcastle-upon-Tyne, 27·4; Glasgow, 29·1; Birmingham, 29·8; Hull, 30·0; Bradford, 30·8; Liverpool, 32·2; Sheffield, 32·5; Leeds, 33·5; Salford, 36·0; and the highest, 37·8 in Manchester. The excess of deaths in the eleven English towns, over those which would have occurred if the average summer town death-rate, 22·5, had not been exceeded, make up a large proportion of the 21,000 excess in the whole of England and Wales.

We have at present no means of ascertaining the total loss of life from diarrhœa throughout the country during the past summer quarter,—we can only roughly estimate it between 15,000 and 20,000. In the eleven large English towns above mentioned the deaths from this cause were no less than 7,656, whereas in 1866 the total deaths in the whole of England and Wales from this disease in the three months was only 9,570, which number was considerably above the average of summer quarters. In very many of the other large English towns the mortality from diarrhœa was fully as great as in these eleven, and from the notes appended to their returns by the local registrars this loss of life was not confined to the large towns, but also occurred to a great extent in small towns and villages, and even in completely rural districts. The mortality from diarrhœa varied very considerably in the different towns, ruled, as it would appear, in a great measure by the general sanitary condition of the populations; it was at the annual rate of 4 per 1,000 in Bristol, Newcastle, and London; 6 in Bradford; 7 in Liverpool, Sheffield, and Hull; 9 in Leeds and Birmingham; and 10 in Manchester and Salford. Facts for the calculation of the rates in other towns are not yet available, but from the registrars' notes it is evident that in very many of them these rates have been equalled, and even exceeded. In Leicester, for instance, out of 785 deaths, no less than 330 were fatal cases of diarrhœa, showing an annual rate of 14·5 per 1,000 from this cause alone.

The mortality from diarrhœa in its summer epidemic form, arises principally from two sources; air-poisoning and water-poisoning. It is impossible to say to which the greatest share of the evil is to be attributed. Fortunately both are almost equally within the influence of sanitary science. The unusual heat and drought of last summer, combined to fill the air with exhalations of putrescent matter, animal and vegetable, which need not poison our large towns, and at the same time so shortened the store of water in many of our large towns, that both the quantity and quality of the supply was much impaired. Manchester and Salford, on the whole, suffered more severely last quarter than any of the other large towns, as in addition to the highest mortality from diarrhœa, scarlatina and different forms of typhus and typhoid fever were also severely epidemic. The water-supply of this city is beyond suspicion, but it is only necessary to read the reports of the medical officers of those towns to be convinced that there are other causes in abundance, causes well within human control, to account for this excessive mortality. We need not, however follow the recent reasoning of the *Saturday Review*, and assert that because the high death-rate from diarrhœa in Manchester cannot be attributed to a faulty supply of water, the high rates of mortality in many other towns cannot, to some extent, arise from this cause. We entertain, indeed, an entirely different opinion on this point.

Fortunately the first two quarters of this year were unusually favourable to the public health, so that the death-rate for the nine months ending September is still rather below the average, in spite of the excess which prevailed during last quarter.

THE RIVER AND WATERLOO BRIDGE.

We mentioned in our last number that we had received a letter from the Clerk of the Waterloo Bridge Company, assuring us that the pier to which we referred on the 17th of October has "been in the state it now is for many years."

We have great pleasure in receiving any assurance of the yet unshaken stability of one of the chief architectural ornaments of the metropolis. It would have been still more gratifying if the courtesy of the Clerk had enabled us to add, as we now do from other and direct testimony, that the course suggested by the *Builder* has been promptly and wisely followed by the proprietors of the bridge, or, at all events, by the proper parties. The stones, between which the black openings mentioned in our columns made their appearance, have been cut out, and are either replaced, or in course of replacement, with new material. The imperfections which arrested the eye of the steamboat passenger are thus removed, and, which is of more importance, it will now at once become apparent, to those who watch the repaired portion of the work, whether there is any tendency to further movement.

The explanation which has been given to us by apparently impartial and well-informed testimony, although not exactly tallying with the statement that the condition of the bridge had been unchanged for many years, is this:—When the piling was being driven for the embankment, we are told that it was found difficult to drive the piles properly under the arch in question, from want of a headway for the fall of the monkey. Lewis-holes were therefore cut in the face of the bridge, in order to form points of attachment for steadying the heads of the piles. It was merely the local defacement caused by this process, it is said, that arrested the attention of our informants. If this be really the case, the black deposit in the opening, which must have formed since the removal of the piling, will have denoted no structural injury, but merely have been a local disfigurement. This view is happily in accordance with an affirmative reply to the main question on which we wanted to be re-assured,—the stability of the bridge.

It will be obvious to our habitual readers that remarks, such as we felt called on to make on this occasion, should rather be welcomed by those who are interested, than regarded with any degree of displeasure. The function of a public writer differs essentially from that of the engineer, or other responsible officer, of any great work. It is the duty of the latter to watch carefully the safety of the works under his charge, and, on the indication of the slightest danger, to satisfy himself fully as to the exact nature of the facts before calling public attention to them in any way. With the writer the case is altogether different. The open-eyed watchfulness of the press is one of the great safeguards of society in the present stage of our civilisation. It is the duty of the public writer to raise no undue alarm, to mention no fact on vague hearsay, and to exaggerate nothing. But it is not his duty either to test the causes of the phenomena to which his attention may be called, or to suppress any intelligence he may receive because it is of a nature to claim inquiry. Such testing he expects to be, as in the present instance it very properly has been, carried out in consequence of his comments. And as in almost all cases of structural dilapidation or decay, the first external indications are usually very slight, it may often happen not only that a warning is timely, but that, happily, no real danger exists. We had, on the other hand, a very ugly instance of what neglect of slight indications of movement, in an apparently very solid wall, may occasion, in the case of the fall of part of the Monte di Dio, at Naples, described in our columns.

The best and most satisfactory reply that can be given to a question as to stability is, that the soundness of the work has been tested, and is perfect. The next best is, that the inquiry has been made in time, and that the proper steps have been taken. In the present instance the second reply has been practically and most commendably given by the proper persons. It will only add to our satisfaction should it prove that the disturbance indicated was strictly local.

In any case of new and unpleasant intelligence it frequently occurs that three answers are successively made by those who consider themselves in any way injured, or reflected on, by the statement. First, it is replied, it is not true. Secondly, it is not new—it is an old story. Thirdly, it is of no importance. We congratulate the proprietors of Waterloo Bridge that their representatives, instead of satisfying themselves with this method of reply, to a hint that has never previously been given by ourselves, nor, as far as we are aware, by any portion of the press, have resorted to the forcible logic of fact. They have not despised warning, but they have taken the proper steps to test, and if necessary to prevent, danger. The most practical and most satisfactory reply to a word of inquiry is that which is given, as in the present case, not by the pen of the advocate, but by the hammer and chisel of the mason.

POSITION OF ARCHITECTURE AND ITS PROGRESS.

Mr. Francis Horner, in the course of his address as President of the Liverpool Architectural Society, said,—Among the works exhibited at Leeds are some of special interest to the architect, the catalogue containing such names as Holbein, Canaletto, Pannini, Guardi, and among modern architectural artists those of Turner, David Roberts, Prout, &c. One picture by Pannini, of the interior of "The Church of St. Paolo Fuori le Mure Rome," belonging to Mr. J. Heywood Hawkins, particularly struck me as a most splendid specimen of the master, being an exceedingly fine specimen of architectural drawing and perspective, and excellent in colour. The subject is a very fine basilica, no doubt familiar to many. It is a picture on a large scale, and in very good preservation. While another, by the same artist, and the property of the same gentleman, of "The Interior of the Pantheon, Rome," displays great power of drawing, and boldness in the treatment of light and shadow, without losing the architectural detail, or yet verging on the other extreme of hardness.

Canaletto and Guardi are also exceedingly well represented, there being two charming companion pictures by the latter (views in Venice) belonging to Mr. John Samuel, excellent in drawing, full of atmosphere, and pleasing in tone, and entitled to take high rank as specimens of architectural landscape.

Perhaps, however, one of the most unique relics of quasi-architectural draughtsmanship which is to be found in the exhibition is a beautiful drawing in pen and water-colour, being a classical design for a cup by Hans Holbein, and which, it is said, was actually executed in silver for Anne Boleyn about 1534. This work, which formerly belonged to Horace Walpole, and is now sent for exhibition by the Bodleian Library, seems a well-authenticated production of this artist. It is difficult to know whether to admire this work most as a specimen of correct and minute, yet spirited, drawing, or as exemplifying about as beautiful a style of design for this particular class of the manufacture in silver as it is possible to imagine, so perfectly is it adapted in all its forms and details to the material it was intended to be executed in. Truly our modern professors of ornamental design might often profit by a study of the chaste and elegant conceptions of this master of his craft.

One is tempted to expatiate somewhat largely over a field so rich in subjects as the Leeds Exhibition undoubtedly is. The works, however, of our great modern architectural artists are too well known and too fully appreciated by architects to require any panegyrist.

A comparison of the productions of our British school of art, up to the early part of the present century, with the Continental works of the same date is exceedingly interesting, and as afforded at this exhibition will not, I think, in the eyes of an unprejudiced judge, prove, on the whole, disadvantageous to the former.

Among the French and other Continental schools we very generally meet with correct drawing (I am now more especially referring to the human figure); but in conjunction with this, in the same picture, if a deficiency is perceptible, it will be on the score of imagination, and a certain monotony of tone and colour. In the works of our own school, on the other hand, the reverse of all this may frequently be found; for in pictures exhibiting high powers of imaginative conception, fine in composition, and rich and true in colour, we may sometimes detect a certain slovenliness of drawing which does not occur even among the inferior of the French works.

These peculiarities, I think, very much illustrate the mode of artistic training pursued in the respective countries. On the Continent

much greater attention is paid to the inculcation of correct drawing than with us, and thus diligently-taught pupils of moderate talent accomplish more almost than could be expected from them; but the wearisomeness of over-labour on technical detail is very apt to cramp the mind, and to stunt the growth of the inventive faculties. The young English artist, if his studies as a draughtsman are somewhat too slender, has the greater opportunity of early cultivating whatever original talent he may possess.

One regrets to see the hand of genius compromised by a lack of technical instruction; but still more unfortunate is it when the mental powers are, by an overstrained mechanical education, made subservient to the merely material section of an essentially imaginative art.

Might not a modification of the system of instruction pursued in each instance lead to advantageous results? The exercise of the inventive faculties should ever be allowed to relieve the drudgery of the mechanical lessons of art; and this observation, I submit, must apply as fully to the case of architectural study as to any other of its branches.

These galleries, however, both British and foreign, alike contain pictures of great excellence and beauty; and what I have just said must be understood as having reference only to what I conceive to be the respective results of the varying systems of art-education in different countries, and is far from being intended as depreciatory of any portion of this fine collection.

Upon such an historical picture as "The Last Sleep of Argyle," by Ward, an Englishman may be excused for looking with pride; nor does the name of Ary Scheffer reflect less honour on his country. While the goodly array of works in one branch of British art form the most striking refutation of the theory published by Winckleman about one hundred years ago, when he declared that the English people must be naturally incapacitated by their climate from attaining any eminence in the exercise of the Fine Arts; for here we have ocular proof of the existence of a school of landscape art among us, both in oil and water colour, such, perhaps, as no other country ever possessed, and to the full development of which our humid climate itself, affording as it does a constant play of light and shadow and great varieties of aërial effect,—a climate which, according to this philosopher, was to be fatal to all our efforts, has doubtless very materially contributed.

Those of you gentlemen who have not visited the Leeds Exhibition I can only advise to do so, before the 26th of the present month, when it closes. Those who have already been there, like myself, doubtless, "still would go," to take a final leave of a collection of works of art, which our late respected president, Mr. Kilpin, whom I had the pleasure of meeting there in the summer, observed to me we should in all probability never see the like of again in our generation.

Another year has passed in which the Liverpool Academy have failed to support an exhibition! This unpalatable subject has on former occasions been so fully enlarged upon that I shall not trouble you with any further observations upon it, but simply state the fact. It is idle to expect that the public will accept, in lieu of the legitimate annual display they formerly enjoyed, any chance collection of a picture-dealer, however good, which may be brought here for sale, even when a charge is made for admission, and a catalogue provided. The Manchester Academy continue regularly to maintain their annual exhibition on a creditable scale.

Amid the strife of conflicting opinions as to the proper adaptation of styles to our modern uses, no work has, perhaps, proceeded more steadily nor stands out in brighter relief in the annals of really artistic architectural practice among us, than the restoration of our grand old cathedrals, which is everywhere to be met with in the country.

The hypercriticism of certain reviewers calling in question the propriety of every step taken, and unscrupulously laughing to scorn, with more zeal than modesty, the efforts of architects of the first eminence in their profession, is singular. While they are ready enough in manufacturing difficulties, they are wonderfully shy in committing themselves by suggestions for the practical solution of any; and if the dictum of the writer of one article in particular which I lately met with is to be followed, it is our bounden duty to allow our cathedrals to fall to ruin and come about our ears, rather than presume to disturb their archæological associations by attempting their repair!

In most cases, however, the question really is, which conduces most to the antiquarian and archæological interest of the building, the hod and trowel of the mason and plasterer, and the brush of the whitewasher of the last century or two (whose incrustrations upon the stone and marble shafts, and enrichments of all sorts, the architect of the nnieteenth century pretty universally finds it to be his first duty to endeavour to scrape away), or the substantial recovery of the original material, and the restoration of the whole, as far as possible, to their pristine beauty?

Questions, of course, may arise as to the desirability of certain details in what as a whole we must approve. Sometimes we may be inclined to doubt whether too much latitude may not have been taken by a restorer in some particulars, as in the insertion of windows of his own design, in the place of others which we have been accustomed to regard as integral parts of a great design, and similar cases.

Such an instance occurs to me in the restoration of Worcester Cathedral by Scott, where at the west end a well-known window of Perpendicular date has been replaced by one of Geometric Decorated.

Yet an accomplished artist must be allowed a certain amount of discretion in dealing with a style of which he is master; and if the member removed, as this window, for instance, may have been deemed by him, from surrounding mouldings and details, to have been itself an interpolation, the step is a legitimate one, in the attempt to restore the supposed original unity of the design.

Take the cathedral in question as an illustration of the mode in which these restorations are executed, and I say it is an honour to our age! In point of intrinsic beauty there can be no doubt that the west end is greatly benefited by the alteration; for it can now boast, perhaps, one of the finest windows, of the best date of Gothic art, to be found in the country.

As to the general effect of the restoration, taken as a whole, no man of any pretension to taste can have seen, as I did, this noble building twenty years ago, with its columns, mouldings, bosses, and enrichments of all sorts, smothered up in yellow wash, and interpolations of all styles and no styles, and dates, disfiguring it in every corner; and now visit it with its marble shafts again brought to light, its groining, and ornamental work and traceried windows really restored, and the whole of the frightful lumber which the dark ages of Gothic (the seventeenth and eighteenth centuries) had accumulated within and around it removed, without feeling that it has indeed risen from the dust and put on its beautiful garments!

Chester Cathedral, too, through the indefatigable zeal of Dean Howson, is at length to be rescued from its present state of utter dilapidation. Nor need we, I think, weep over the removal of each decayed stone, whose only interest in general consists in the almost preternatural state of pulverization to which they have been reduced without the whole coming to the ground. A few remnants of the panelling of the upper stages of the tower alone remain to attest the original richness of its design, the character of which, it is to be hoped, will be carefully preserved in its resurrection.

I have referred to the strife which exists in the architectural world with respect to the course necessary to ensure the true progress of the art; and the difficulty of the case is no doubt very complex, arising as it does, not from the lack of material on which to work, but from its very redundancy.

It is often charged upon the architecture of our own day that it is effete, and that as an art it has absolutely ceased to exist. Now, may we not trace some parallel between the present state of the architectural art and the language which we speak, more especially in respect of their derivative character?

If our architecture is a compound of Greek and Roman, of Italian and French Renaissance, and Gothic, is not our language equally compounded of and derived from all these sources? To the Greek, the Latin, and the Teutonic races, and even to modern France, how much are we indebted for its richness, its fulness, and perspicuity?

The comparatively contracted mental development of the rude Anglo-Saxon required, no doubt, a very simple form of speech wherewith to express any ideas he might wish to clothe in words; but, as civilization advanced, the science of language naturally became more complicated, and we find ourselves now supplied with an ample vocabulary, borrowed from all the foregoing sources, wherewith to give utterance to our thoughts. If in some particulars this fusion of tongues and dialects may lack the grandeur of simplicity which some original languages possess, it at least affords other advantages,—of being full almost to redundancy, and of forming a very perfect channel for the expression of intricate ideas. We do not, because we possess such a multitude of derivative words, therefore declare the English language to be effete; but, on the contrary, accepting its mixed character as an almost necessary result of the passage of time and our knowledge of the past, we admit at once that it is admirably suited for our state of high intellectual culture.

So with our architecture, accumulated as its knowledge has been from the lights of past ages. The researches of the archæologist and our intercourse with foreign countries have legitimately placed this acquired experience of generations within the grasp of the practitioner of the nineteenth century, to be interpreted and adapted freely by him, and, with the additional resources which a man of talent ever has at his command, from the exercise of his own individual invention, to be used for the purpose of meeting the complex circumstances and requirements of a refined age; and thus treated as an art, it is still a living and progressive one.

Many and great, however, as are the facilities and appliances which attend a state of high civilization in the culture of science and taste, it may well be doubted whether, in respect of the latter at least, these acquisitions are unmixed benefits. May we not, on the contrary, often find in the works of our forefathers much of simplicity, of unity, of repose, and association, which our modern designs frequently lack, but which, after all, are very important elements of power.

One of the characteristics of our own day, no doubt, is that scientific knowledge and mechanical skill have advanced in a much greater ratio, even within our own recollection, than artistic feeling or taste; and there seems to be some danger of the spirit of the latter being almost merged in the general utilitarian tendency of the age. It behoves us, then, to combine in keeping alive some spark of regard for the poetic, by every means in our power; and I cannot think that for the attainment of this object, it is wise with regard to any art, not even of the art architectural, constantly to crave after some new thing.

Architecture, like its sister arts, has a noble history to look back upon; and her development has been as gradual as the lapse of years, upon whose centuries it is written in living stone.

The growth of the architecture of Greece was the work of hundreds of years; and it slowly arrived at its perfection by the patient and careful study of harmony of proportion and beauty of form; and the same truth is to be learnt from the history of the rise and progress of Gothic art.

No real advance in art was ever attained by the ignoring of any one of the elements of beauty; and beauty, we are taught by nature herself, is an essential element in all that can delight.

"Beauty," says a writer in *Fraser's Magazine*, "is everywhere, unnecessary, useless beauty, throughout earth, water, air, and the infinite of space; and everywhere developed, in metre, in balance, in rythm, in symmetry; the grand original Poiesis."

There is a great truth in this quotation; but such words as "unnecessary" and "useless" can never, in their ordinary acceptation, be applied to any works of nature.

That elements of beauty everywhere exist in nature, supplying no physical want, and ministering to no material necessity, is, I think, the most striking argument which can be adduced in proof of the vast importance of the place assigned it in the economy of creation, as a moral and intellectual agent for the mental use of man; and thus viewed, every trait of beauty to be found in the universe is in the highest sense both necessary and useful.

Founded on an innate love of the beautiful, that subtle and delicate mental gift called "feeling," is in fine art the key to truth; and all that is lofty, refined, and consistent is perceived through this faculty. To him who possesses it not, I fear it can never be supplied by reason or philosophy.

There are men to be found moulded much upon the model of our iron age, who seem ever desirous of dragging down the standard of taste to a level with their own perceptions; possessed of no sensibility themselves, they ridicule its presumed assumption by those who do possess it; ignoring the probability that the deficiency may reside in their own prosaic and matter-of-fact brain, and not in any affectation of the poetic mind of the artist. To such spurious connoisseurs as these we may reasonably assume the Poet Laureate to have addressed his objurgation:—

"Vex not thou the poet's mind
With thy shallow wit;
Vex not thou the poet's mind,
For thou canst not fathom it."

The well-informed art critic who is philosophical in thought, and moderate and judicious in the statement of his opinions, is entitled to our respect, and is often a very valuable coadjutor to the man of genius in the attempt to forward their common cause, and to raise the tone of the public mind to something like an appreciation of questions of taste. But it behoves these gentlemen to be careful that, even when perfectly honest and unbiassed in the treatment of their subject, *they* do not fall into the error of conventionalism, both in idea and expression; an offence which they are wont to visit somewhat heavily upon the heads of any whom they may deem amenable to it.

Among the stereotyped phases of modern criticism, intended generally to express a high meed of praise, none is more common than that of referring to certain artists as "conscientious."

Now when we happen to have had our attention called to the productions of these "conscientious artists" it has proved that this commendation is, as a general rule, bestowed on works conspicuous only for want of beauty, originality, and imagination, laborious though they might be; and our memories may recur to a particular class of pictorial works to which this epithet used to be so overwhelmingly applied that the only inference to be drawn was, that if these were indeed so conscientious, the endeavour to delineate ideal beauty must be highly "unconscientious," and therefore a moral delinquency.

Now I *conscientiously* believe that this term is, in the literary world of art, greatly misapplied, and has become an apology for a species of imitative pedantry, at the expense of the legitimate end and aim of fine art.

My understanding of a "conscientious artist" is one who exercises his imaginative faculties, in conjunction with his manual ability, to the utmost of his power, and thus emulates the examples of his great predecessors, under the guidance of whose genius all art has been gradually built up, and has culminated in every worthy school which the world has ever produced.

The opportunities which the modern architect enjoys of exercising his talents upon works of national importance or of great magnitude are, I fear, few and far between. But if this be denied him, yet many occasions must occur in the course of the practice of a lifetime which shall enable him to illustrate the true principles of his profession, and leave enduring monuments of his skill, which shall influence the future development of his country's architecture in long years to come. . . .

But never let us assume that high ends in art can be lightly attained. To the sublime, the beautiful, the true in nature, the professor must appeal for inspiration. But his efforts will still be vain unless with this be united, in a greater or less degree, that magic talent which seems almost, as it were, a reflex of the mind of the Supreme Being, and a delegation of one of the Divine attributes to the use of man—*the gift of creative power.*

MIDDLE-CLASS SCHOOLS.—Among the many conversions and improvements of property in recent completion or in progress about the City, there is one which commands the deepest interest, indicating (as we believe it does), moral no less than material progress. The corporation for middle-class day-school education in London has purchased, at a cost of 29,000*l.*, a site of an acre and a quarter on the Finsbury estate, belonging to the Ecclesiastical Commissioners, and is already busily engaged in clearing it, and erecting school buildings for 1,000 boys.

THE INSTITUTION OF SURVEYORS.

INAUGURAL ADDRESS.

THE first opening meeting of this Institution was held on Monday last at No. 12, Great George-street, Westminster. In spite of the rival attraction at the Guildhall, the room was full to overflowing, and many of the well-known surveyors both in town and country attended. The president,

Mr. John Clutton, delivered an opening address. He said—It becomes my duty and pleasure, as your first president, to address a few observations to you on the nature and objects of this Institution. I shall endeavour to compress them into as few words as possible, as it must be sufficiently apparent that the success of the Institution will rest upon the practical efforts and unceasing perseverance of its members, and not upon any efforts of mine, beyond a few simple words by way of introduction, in these the earliest days of the infancy, of what I have no doubt, with the good-will and energy of its members, will become a most valuable Institution. But, before I proceed, I must state with what great diffidence I appear before you as your first president. I cannot but feel wholly inadequate to the task of properly supporting the position in which I am placed by the unanimous vote of the members who first took upon themselves the somewhat arduous and responsible duty of selecting the executive for this Institution. This, however, I may be permitted to say, that though there are very many amongst you much my superiors in intellect and skill in our common profession, there are none who feel a more lively interest in its well-being, or who have more persistently endeavoured, throughout a busy professional career, to maintain our calling in a position which many of us must have felt has not heretofore been recognized by the public. Many causes have combined to produce this result, but the principal one has been the absence of a common centre of association, to which the public might look as some guarantee of the trustworthiness of its members. Every other profession or body of men, having a common occupation, has long since perceived the necessity of association, and found the great benefits that have arisen to the members forming such associations. I can only account for the fact that surveyors have so long remained isolated, without any such common centre into which individual experiences may flow to be discussed and matured, by the recollection that they have hitherto lived and laboured in local centres, distant from each other, formed and maintained by individual energy, but wanting a common bond of cohesion; and it is superfluous to say how much each one so labouring must have felt the need of an institution "established to secure the advancement and facilitate the acquisition of that knowledge, which constitutes the profession of a surveyor." Even the man in the largest local practice must acknowledge the necessity of that finish (so to speak), which can be alone obtained by the friction of mind with mind among professional brethren.

In speaking of local centres, I allude not only to those large country districts, in which many of our members have taken a prominent and distinguished part; but I include even this large metropolis, in which there are many local centres; and it cannot, I think, be doubted that we shall all greatly benefit by the interchange and expression of thoughts and opinions, many of which can be improved, corrected, and made more useful by discussion and intercourse. The probable reason why such an Association has only partially been attempted, was the difficulty in olden days of travelling by coaches and slow conveyances, and of inducing individuals to expend so large an amount of time as would have been necessary to attend the meetings of a society in any central district.

The advent of railways, however, effected a revolution in locomotion; and none have benefited more largely, in every way, than the surveyor, not only from a pecuniary point of view, but as enabling him to associate more freely with other members of his own profession.

The first society of which I have any knowledge was formed in 1834, and was called "The Land Surveyors' Club." It was in the early days of railways and of other great changes tending to emancipate land and trade from trammels which had, until then, retarded their development and improvement.

It became apparent to the surveyors in and around this great city that changes were in progress which would vastly affect the value of land,—the staple article with which they had to deal. In addition to the general introduction of railways, other most important legislative enactments were passed affecting land and consequently the surveyor. Of these I may enumerate, "The Commutation of Tithes Act," "The New Poor Law Act," the Acts withdrawing generally restrictions on trade, "The General Inclosure of Waste Lands Act," and "The Copyhold Enfranchisement Act," and other similar Acts, all tending to increase the demand for land. Six members of our profession, feeling the need of a common centre for mutual support, and for facilitating the discussion of subjects brought before them by the new legislative enactments, started the club; but this society was limited, as its name implied, to land surveyors only.

The Land Surveyors' Club eventually became, what its name implied, almost exclusively a dining club, and, as it was found difficult to dine in large numbers, was limited to forty members; but even the meeting for the purpose of dining was found so greatly to benefit the members in the discharge of their business transactions that as the numbers of that club could not be largely increased, others were established both in London and in other large centres of industry, taking into their society not only the land surveyor, but also the building and mineral surveyor. These, also, were essentially dining societies; but they all were evidence of the desire for co-operation, and to this end the gentlemen who formed this institution, and amongst whom will be found representatives of every class of surveyor, commenced their work to combine in one institution all the surveyors of Great Britain.

It may now, perhaps, be well that I should shortly state the steps taken to bring about the desired object.

On the 23rd of March last a meeting was held, at the Westminster Palace Hotel, of those persons who had given some indication of their desire to see a combination of the various branches of the profession. At this meeting the following resolutions were passed, viz.:—

"1. That it is expedient that an association be formed, to be called 'The Institution of Surveyors.'

"2. That the undermentioned gentlemen do, with this object, form themselves provisionally into such association, and take the requisite preliminary measures for organizing the institution."

The following were the gentlemen who, by this resolution, formed the Provisional Association:—Messrs. Chas. F. Adams, Virgoe Buckland, W. J. Beadel, F. J. Clark, Edwd. N. Clifton, John Clutton, Henry Crawter, J. B. Denton, R. C. Driver, Richd. Hall, Thos. Horsey, H. A. Hunt, Thos. Huskinson, Jeremiah Mathews, John Oakley, Edwd. Ryde, E. J. Smith, W. Sturge, George Trist, and Francis Vigers.

At the same meeting, a resolution was carried to the following effect:—"That the undermentioned gentlemen, viz., Messrs. Hunt, Clark, Denton, Vigers, Driver, Ryde, Clutton, and Trist, be appointed a committee to prepare and submit a report to the Association." Here I am pleased to record the fact that we are indebted to our learned associate, Mr. John Horatio Lloyd, for being good enough to aid us in the preparation of the above resolutions; and that we have, throughout our labours, been much assisted by his kind and very able counsel and advice. The committee above mentioned met, and, with the very valuable co-operation of our honorary secretary, prepared the bye-laws and regulations, which were duly reported to a general meeting of the Association, then enlarged to about fifty members, and by that meeting, held on the 15th of June last, were made and established. At this meeting, also, the seventeen gentlemen whose names appear as the first council were elected by ballot; and they afterwards selected from among themselves the president and four vice-presidents. At a subsequent meeting, the council had the great pleasure of electing the two associates, Mr. Lloyd and Mr. Bramwell, who now aid us with their counsel and advice. Thus, gentlemen, this Institution first came into existence.

I need scarcely say that, in common with all things human, the early promoters of the movement met with many difficulties and some disappointments, and I regret that a few of the most eminent and respected of our brethren are not found in our list of members. As the council is from necessity limited in number, it was most

difficult to make a selection of representative men at the Board; but I can conscientiously assert that it was the object of all concerned to extend it as far as possible, so as to embrace gentlemen representing the various branches of our profession. Fortunately for the members generally, they can at the end of the first year reform (if reform is needed) the present council, which has undertaken the somewhat arduous duty of bringing the first year's operations to a successful issue.

So far as we have gone I think I may congratulate the members of the Institution upon the success which has attended our work. We have now enrolled amongst us 131 members and nine associates, and I am sure that as the Society becomes better known its members will largely increase. It cannot, I think, be doubted, that great benefit will be derived from frequent intercourse; and that the public at large will benefit by the more wholesome practice which must follow from such intercourse: for I cannot conceal from myself the fact that, as individuals, we have sometimes forgotten our true and legitimate position as surveyors and valuers, and have allowed ourselves to become partisans and advocates; and that, under the guise of giving opinions, we have allowed our zeal or our imagination to lead us somewhat astray. The business of the surveyor, I hold to be to give an unbiassed opinion upon the subject placed before him, and not to become, in any sense, the advocate. As it was once said by a respected surveyor, upon being asked if he was "concerned" for some one, he replied, "I am employed by him; but not 'concerned' for him." If we could only keep this in view, such startling differences as have been found amongst surveyors will seldom be met with; for it can scarcely be possible that such differences can properly exist between respectable men, having, as we ought to have, a proper regard for our profession, and the Society to which we belong.

This Institution has, in truth, like other similar institutions in this great country, arisen from the wants of society, and being the natural result of its present state, promises, I think, to be both useful and lasting.

Law, physic, and divinity, have long had their several internal regulations. The City trades were formed into companies so long since, that in some cases the original foundation is lost. The lovers of wisdom originated the Philosophical Society two hundred years ago, and in no part of the intervening period has that society failed in its transactions; the Royal Academy of Painting has celebrated its centenary; the Society of Arts has continued with more or less success for 115 years; and many kindred societies have subsequently been formed, and have worked great good, both to their members and to the public. One is worthy of special mention—the Institution of Civil Engineers. It appears from their records, that a society, or rather a club, was formed in 1771, mainly by the efforts of Smeaton; but the members were few, and it was most difficult to get together more than four or five members at a meeting.

This date takes us back to the time when Brindley and Smeaton were required to form canals to convey the enormous increase in manufactured goods, which ensued on Watt's improvement of the steam-engine, the foundation of the subsequent eminence of the country. The recovery of coal at a reduced cost gave the country that power of cheap production which ultimately so burdened the canals, that goods waited for weeks at Manchester for their turns of transit, and yet the canals carry to-day, between that place and Liverpool, more goods than they did before the railways were made. Canals, bridges, roads, harbours, and railways have in succession developed the latent powers of the engineers, and their institution originated when their works became of importance.

It was not until 1817 that the present Institution was established, and it is recorded, "that a few gentlemen, impressed with the difficulties young men had to contend against in gaining the knowledge requisite for the diversified practice of engineering, resolved to form themselves into a society for promoting a regular intercourse between the persons engaged in its various branches, and thereby mutually benefiting by the interchange of individual observation and experience."

How well does this describe our own position, and what we must all have many times felt.

Now, what has been the result of the establishment of the Institution of Civil Engineers, both upon its members and the public at large? It numbers now about 1,500 members of all classes. Meetings are held weekly during the session, at which the average attendance is nearly 250 persons; and surely it cannot be doubted that the mighty results brought about by the labours of the civil engineer could never have been accomplished if the individual members had not been able to secure the aid and support of the important body to which they belong. Thus will it be with this, our Institution, if the members are only true to themselves and the society; for the surveyor's practice, like that of the engineer, is greatly diversified; and it is scarcely possible that any body of men can have to deal with more important and more constantly varying and increasing interests than the surveyor.

The Royal Institute of British Architects is also of a kindred character, but confined almost exclusively to architects in practice. It was formed in 1834, and now numbers upwards of 600 members of all classes. The Architectural Association, which consists chiefly of students and the younger members of the profession, may also be mentioned. This was established in 1842, and has now upwards of 400 members. The Mining Engineers' Society, of Newcastle, was started in 1852, with eighty members, and now comprises 320 members, publishing monthly a most valuable series of transactions. This society admits coal-owners, as having a material interest in the success of the institution, and any literary, scientific, or practical members of other professions, whose labours, talents, or professional experience can aid its labours.

Although the Institution of Civil Engineers may be the society to which we are most nearly allied, there are many other societies to whom we are indebted for much knowledge that is essential to the surveyor. For instance, the Geological, the Botanical, and many others, which aid in the formation of that judgment required successfully to deal with land under its different circumstances of soil, locality, and climate.

The founder of geology was a surveyor who travelled more than once over the whole of England, before he made sections from side to side, and delineated with an accuracy which has well stood the test of time, the order in which the several strata, from primary to tertiary, rise successively to the surface, between the Welsh hills and the eastern coast; and to him, as a geologist, the country is indebted for the opinion that the Durham coal-field underlay the magnesian limestone. This opinion was the basis of expenditures varying from 100,000*l.* to 300,000*l.*, to pierce through that limestone to the coal at a depth of 1,500 ft., expenditures most profitable, and adding nearly one-third to the area of the Durham coal-field. Now what would that man have given for the support of an institution which could have endorsed his facts twenty years earlier than he could himself force them upon an ignorant and, to a certain extent, unwilling public?

In a great and free country, where land is constantly being converted to more valuable purposes, and where the value may vary from a few shillings to a million pounds per acre, it must be apparent that the surveyor, through whose hands all these transactions pass, and by whose skill and experience the face of the country is changed from barren wastes to fertile fields, and prosperous thriving towns, with their docks, railways, and every variety of commercial and manufacturing premises, must, to discharge his duties effectually, be a person of enlarged and cultivated knowledge; and it is evident that the surveyor has not generally held his proper position amongst the professional men of Great Britain. There can be no doubt that the duties of a surveyor have increased to an extent and importance which demand the establishment of an institution; and I am proud to be one of those met together, this day, at the commencement of a new life for a profession to which many of us owe so much, and to which we are all attached.

I endeavoured just now to shadow forth some of the reasons that tended to depreciate our position in the public opinion, but there are others. A considerable number of the men in country districts called "land agents" are, in fact, not surveyors at all. Many most respectable gentlemen are entrusted with the management of land, whose education and early pursuits were directed to entirely different objects. Gentlemen learned in the law and physic, officers of the army and navy, and members of other classes of professional men, think themselves competent to manage and deal with land.

How strange would these gentlemen think it if the surveyor advised on abstract questions of law, or ventured upon a surgical operation, or undertook to manœuvre a regiment of soldiers, or to navigate the Channel fleet; yet officers of these services undertake the management of land, than which nothing requires a larger amount of professional knowledge and experience to manage properly and successfully.

I have time left only to indicate briefly some of the various duties of the surveyor, commencing with the ancient forest.

In years gone by, the planting and management of the oak forests would have been one of the duties of a surveyor; but the days of oak forests are numbered, and iron supersedes wood in the walls of old England. At present, the surveyor's attention is chiefly directed to plantations for ornament and shelter, but there is room for clothing many bleak sides of hills with trees, to the profit of the owner and the advantage of the country.

The surveyor now has to devise the most inexpensive and ingenious ways of rooting up the remains of the forest and converting the soil into productive land, and the clearing, road-making, fencing, and draining; the erection of farm premises, and the finding suitable tenants; with the framing of leases for the due cultivation of the land, holding an even balance between the lord of the soil and his tenants. All the above are works requiring great knowledge and experience. At another period the surveyor has to convert and utilise land for building, to lay out and make roads and sewers, and in fact prepare the land for the builder. So again with docks and railways. The surveyor not only measures and maps the ground to be converted to commercial purposes, but his skill and experience are again brought to bear upon the sale and purchase of the land before the engineer can commence his operations. The surveyor's services are again required in the measuring of buildings and estimates of their value, and also in the estimate and sale of wharfs, docks, and other commercial property; and last, though not least, the services of the mineral surveyor are necessary in the management and exploration of our mines. These all afford vast fields and scope for the skill and experience of the regularly-educated surveyor, and it is evident that miserable failures must be made by men who assume to be surveyors, but who have had no proper education to enable them to carry out the important works briefly enumerated above.

There are one or two subjects which must shortly more engage the attention of the surveyor. To mention one only, and that, perhaps, the most important, viz., the utilization of the refuse and sewage arising from our population. Hitherto the object appears to have been to get rid of all such matter, at a great cost, into the nearest stream or water-course, thereby transferring to other localities the nuisance and evils arising in our towns. Scarcely any attempt has been made to convert the most valuable manuring matter to any useful purpose. It is for the surveyor to aid in the application of this matter, so as to render our fields more productive, and to convert a substance which, misapplied, is so destructive of life, to the support of life, and the increase of the nation's wealth and happiness.

I will not here enter upon the large questions which are now ripe for discussion, viz., whether the dry earth system is the better method of conveying away the more valuable manures contained in sewage; or, whether we must continue to use the present expensive mode of getting rid of it by sewers which, have not only to be made large enough as at present usually constructed for sewage proper, but for the rain-fall also. The question to be discussed in this room would be, whether the manuring value of this refuse is better and more economically applied in a fluid or dry state? and I hope soon that some one of our members will prepare a paper, and so lead to a full discussion upon this most important subject.

It now remains for me to indicate the line of action which this Institution is likely to take. Offices and a convenient room for our meetings have been secured, to which is attached a reading-room and library, open at all times to members of the Institution. The room will be supplied with papers, &c., for the convenience of members.

General meetings, it is at present proposed, shall be held in this room on alternate Mondays, at eight p.m., in the seven months beginning in November and ending in May. At these meet-

ings papers will be read upon subjects interesting to the surveyor, and discussion will afterwards be open to the persons present. It is proposed to print and distribute the papers, with a short statement of the discussion which may have taken place.

The bye-laws and regulations have been prepared with great care, and I hope they will be found sufficiently matured to be a basis upon which to rear an important structure. But, however sound the foundation, the ultimate completion of the Institution, its future prosperity and usefulness, and, indeed, its very existence must depend entirely on the good sense, the personal conduct, and the individual exertion of every member; and I feel assured it will be enough only to mention this circumstance to command the best efforts of the members, always bearing in mind that talent combined with respectability are preferable to mere numbers; and that, from too easy and promiscuous admission, unavoidable, and not unfrequently incurable, inconveniences perplex and sometimes destroy societies.

The council hope that the members will bear in mind that it is important to have a good library, and that books and maps should be presented at an early period. It will also be of great value to have plans and reports of works executed or designed, with the result of their cost, &c.; and it is hoped in course of time to make the Institution a centre for the accumulation and diffusion of all information and matter of interest to the profession.

Our very able honorary secretary has kindly, for the present, undertaken to carry on the business of the society with the aid of an assistant secretary. The Institution, thus fairly started, must run a successful course, if the members are only true to themselves, and it will prove of great advantage both to the members and the public.

Mr. J. H. Lloyd (associate) in an eloquent speech moved a vote of thanks to the president, and, as an outsider who took a great interest in the profession, begged permission to add a few words of kindly advice and encouragement. He had seen and talked to some of the eminent gentlemen whom he believed the president alluded to with regret as not having joined the Institution. They had doubted its success, and wisely shaken their heads, but head-shaking was very easy; and he never yet knew anything worth the doing accomplished by doubters. Would Columbus have discovered the continent of America, or would those wondrous cables have been laid to connect his new world with the old if courageous minds had been dissuaded from the attempt by shaking of heads? He advised the members to discard all doubts of success; to fail in a great end was nobler far than not to endeavour. It was well not to promise or to anticipate too much, but he thought they might calculate on the attainment of three objects—intellectual advancement, social elevation, and moral improvement. As judges, as arbitrators, witnesses, or advisers both in public and private capacities, a general as well as a special knowledge was most important. Social elevation and moral improvement would go hand-in-hand, and, though it might ill become him to say to those present that any of the latter was needed, he would take this opportunity, while they were talking as friends, boldly and frankly to mention a subject that was often in his mind. He believed that as judges, arbitrators, or advisers there was no body of men more upright and responsible, and more anxious to do what was right at any cost than the surveyors of Great Britain, but he was bound to say, from a somewhat large experience, that as witnesses he had sometimes observed a zeal which must put a strain upon the conscience. No client had a right to ask a surveyor for more than an unprejudiced opinion, or get him to pander to his stupidity for his own gain; let there be less of that overweening confidence of statement, which not only does more harm than good to the client, but lowers the surveyor in the estimation of all right thinking men. The institution could only be a success by constant and combined efforts, and he specially urged on the younger members the necessity of attending the meetings, and taking part in the papers and discussions.

Mr. Richard Hall briefly seconded the motion, which was carried by acclamation.

Mr. F. J. Clark then moved a vote of thanks to Mr. Lloyd, who was always ready to assist surveyors with his purse, or with his counsel, and had so eloquently reminded them of their duties that evening. This was seconded by Mr. Huskinson, and carried amidst great applause.

Thanks were also accorded to the honorary secretary (Mr. J. W. Penfold), and a most successful meeting terminated with the announcement, that a paper would be read on Monday evening, November 23rd, entitled "Historical Notes," by Mr. Edmund James Smith.

GUILDHALL: LORD MAYOR'S DAY.

EVERYTHING passed off most satisfactorily in the City on the 9th of November. The arrangements at the Guildhall, and the hall itself, now completed, were most creditable to Mr. Horace Jones, the City architect. The lobbies were decorated with sculpture from the studios of Mr. Durham and Mr. Theed, and in the Alderman's Court-room was set up an effective scenic picture, by Mr. Frederick Fenton, representing the Attack on Magdala by the British Army. The stained-glass windows in the hall were illuminated from behind. The great Lancashire memorial window at the east end came out beautifully. A handsome carved oak screen, or rather reredos, has been set up under it, at the back of the dais. Some of the other windows were but dimly seen, probably because of the blaze of light in front of them. The scene, as a whole, was as grand a sight of its kind as ever was looked upon. A little less trumpeting,—two blasts, for example, to each toast instead of four,—and fewer repetitions by the toast-master, of "May it please your Royal Highness," would have left cynical visitors without a ground for grumble. The Lord Mayor, Jas. Clarke Lawrence, pleasantly indicated the wise spirit that will influence him during his mayoralty when he said, in one of the many excellent speeches made by him during the dinner, "I do sincerely hope that during my year of office the Mansion House may be regarded as the proper centre and home of all who are eminent in art, science, and the civilization of our time."

KENSINGTON SICK ASYLUM COMPETITION.

THE Asylum Board have purchased six acres of land at North End, from Captain Gunter,—a plot in between the West London Railway and Beaufort House; and here it is proposed to build an asylum for 600 patients. Six sets of designs have been sent in by the following architects. We add the amount of the estimate in each case where it is attached to the drawings:—

Messrs. Hunt & Steward	£55,000
Mr. Allom	?
Mr. Williams	48,000
Messrs. Nesfield & Shaw	45,000
Mr. F. H. Pownall	39,800
Messrs. Giles & Biven	36,700

The design by Messrs. Nesfield & Shaw has been selected, subject, we suppose, to the verification of the estimate. Of this, however, there is probably not very much doubt, provided any of the other estimates be correct! It is very plain externally, and peculiar. The walls are of brick, the roofs of tiles, and in parts the walls of the upper story are faced with weather tiles. When we add that there are tall brick chimney-shafts, and that the windows are filled with thick wooden sashes and small panes of glass, it will be seen that it presents a rural and almshouse-like aspect, such as belongs to some buildings of the seventeenth century. We have no doubt that it will produce a very agreeable effect. The plan, too, appears to have been carefully studied. The wards are to be warmed by earthenware stoves in the middle of the floor, the flues from which pass up through the other floors. The position of the W.C.s seems open to question.

DUMFRIES INFIRMARY COMPETITION.

THE conditions issued by the governors contain a very objectionable clause. After announcing that, "though they will consider favourably the claims of the architect who obtains the premium, [they] will not be bound to employ him to carry out the work," they continue,—

"It is proposed to expend the sum of 10,000*l.* upon the buildings, which sum shall include the architect's fee and the salary of the clerk of the works, the amount of *which fee and salary shall be stated by each architect* in a slump sum.

The architect whose plans may be selected as the best shall not be entitled to payment of the premium unless and until the committee and governors are satisfied that the works can be contracted for at or within the said sum of 10,000*l.*, including as aforesaid."

In other words, as will be seen, the governors, in a by sort of way, invite a competition for terms amongst architects, tempting competitors to name a low sum for remuneration as a means of increasing their chance of being selected. Architects will do well to reflect before they respond to this condition. The profession is being dragged into the dirt.

The premium really offered to the successful competitor is 50*l.* A correct estimate of the cost of carrying out his design would itself cost more than double this amount.

THE INSTITUTION OF CIVIL ENGINEERS.

THE Council have issued a list of subjects upon which, among others, communications are invited for reading at the meetings of the Institution. For those approved premiums will be awarded. Amongst the subjects given are the following:—

On the present state of knowledge as to the strength of materials.

On the theory and details of construction of metal and timber arches.

On land-slips, with the best means of preventing or arresting them, with examples.

On the principles to be observed in laying out lines of railway through mountainous countries.

On the most suitable materials for, and the best mode of formation of, the surfaces of the streets of large towns.

On the construction of catch-water reservoirs in mountain districts, for the supply of towns, for irrigation, or for manufacturing purposes.

Accounts of existing water-works.

On the drainage of towns, and the ultimate disposal of town refuse.

On the employment of steam power in agriculture.

On the ventilation and warming of public buildings.

On the design and construction of gas-works, with a view to the manufacture of gas of high illuminating power; and on the most economical system of distribution of gas, and the best modes of illumination in streets and buildings.

The first meeting of the Institution for the ensuing session, to be held on Tuesday, the 17th inst., will take place in new premises erected during the recess on the old site in Great George-street.

PROPOSED SANITARIUM AT WESTON-SUPER-MARE.

A SITE having been purchased for the Sanitarium, having a house upon it capable of accommodating twenty patients, plans were prepared by Mr. Spencer, architect, Taunton, in order to show how much building may be added to, and the site utilised. The cottage system has been adopted, on account of its elasticity. What has been aimed at has been to obtain facilities of communication; but at the same time (as on the pavilion principle in hospitals) to isolate each building as much as possible for the sake of the thorough circulation of the atmosphere and complete natural ventilation. The present site will be sufficient for eight blocks, or cottages, without crowding, all connected by corridors. All the apartments used by the patients are on the ground floor, and on the same level, thus the fatigue of making use of stairs is entirely avoided.

The apartments for women are on one side, and the men's apartments on the other. They consist of bedrooms, a day and dining room for each six, with rooms for the master and matron, the kitchen and offices, common to all, being in the rear. In the rear of the kitchen, and as far removed as possible, are the sick-wards for cases of relapse, and all the usual and necessary offices adjoining. Each bedroom for convalescents is calculated to hold five beds, thus giving 1,000 cubic feet to each; but in the sick-wards 1,500 cubic feet have have been allowed to each patient.

A conservatory and the corridors would serve as places of exercise in inclement weather; while, as the former leads directly on to the beach, bathing-machines could be brought up to the door and be entered by patients under cover.

A tower serves as a distinguishing mark to the group of unpretending buildings. The tower staircase leads also to the tops of the corridors, which have flat roofs, and are useful ambulatories. Numerous points of access are provided from the corridors to different plots of garden-ground.

METROPOLITAN BOARD OF WORKS.

Dangerous Structures.—At the meeting on the 6th inst. the clerk read a letter from Sir M. E. Hicks Beach, bart., Home Office, inquiring whether the Board would have any objection to undertake the duties, imposed by the Building Act, with regard to dangerous structures in the metropolis, now performed by the commissioner of police. The matter was referred to the Committee of Works.

Improvement of Park-lane. — At the same meeting, the Works and General Purposes Committee brought up a report recommending that an improvement should be made in Park-lane by purchasing the two northernmost houses on the east side of Hamilton-place, to pull down the fronts and widen the roadway to 40 ft., and that the road should be carried northwards, in a straight line with Hamilton-place, into Park-lane, and that the solicitor to the Board (Mr. Smith) should issue the necessary notice for an Act in the ensuing session of Parliament. This was embodied in a motion, put, and agreed to. It has yet to be seen, however, if the Commissioners of Woods and Forests will assent to the plan.

THE SEWAGE FOR THE SOIL.

The Leamington Local Board of Health have at length become convinced that the attempt to deodorise the town sewage is a failure, and they have unanimously resolved to adopt irrigation. At a meeting of a committee of the whole Board, a sub-committee has been appointed to look out for land suitable for irrigation. The question, however, whether the sewage should be pumped on to the land direct from the sewers, or shall first have some solid matter extracted, was left open for future consideration.

The Leicester sewage question seems to be approaching the same solution. The local *Advertiser* says:—

"The official report of the analytical investigation of the merits of the two systems of treating town sewage, namely, that of deodorising it by means of lime, and Mr. Sillar's method of treating it, will be read with considerable interest by most of our readers. They will see that no very brilliant result has been arrived at by the latter process. In the former, that of deodorising it by means of lime, much of the fertilising properties of the sewage was, as is well known, lost. Mr. Sillar's process is an improvement in that respect; but still it must be pronounced as very far from being satisfactory. By neither of the processes can the liquid be so far purified as to be fit to be permitted to enter a running stream. Science, hitherto, is at fault in this respect; no chemical means having yet been discovered that can thus far effectively purify wage.

One strange discrepancy is apparent in this report between the calculation of chemists as to the value of deodorised manure as a fertiliser, and the price it fetches in the market. While they estimate it as worth between 13s. and 14s. per ton, experience teaches that, in the market, but 1s. per ton can be obtained for it. Farmers may, perhaps, deem it worth while to test this matter. Either the chemists must have strangely miscalculated, or else here is a manure selling at less than one-thirteenth of its intrinsic value. As a manufacture of solid manure Sillar's process is reported as being 'much superior to the treatment by lime, although it fails to extract more than a very small portion of its valuable constituents.' The report states that 'no chemical process is known which even remotely approaches irrigation in its efficiency as a purifier of sewage.'"

SANITARY MATTERS.

Falmouth.—The sanitary condition of Falmouth, at the present moment, seems to be as bad as it could have been had there been no local board of health in existence. The very best parts of the town are hotbeds of fever. Woodlane-terrace, Florence-terrace, and the neighbourhood, whose proximity to the sea and great elevation would be supposed to render them peculiarly free from zymotic diseases, are declared to be the most infected parts of the town. One medical gentleman in the town has no fewer than forty cases of fever under his own care, the majority of which are situated in this district; and the other medical men, says our authority, are, to use an expressive phrase, "run off their legs;" so that the extent to which fever has laid hold of the town is something alarming. In front of almost every house is a cesspool, the only receptacle for the whole drainage of the house, and from which noxious vapours are continually arising and poisoning the neighbourhood; whereas, in the lower part of the town, a large portion of the sewage matter is conveyed at once into the harbour.

North Shields.—An epidemic which recently broke out in North Shields continues to run its course, no abatement in its severity being yet visible. Mr. George Bell, at the Tynemouth Town Council's last meeting, said that there were from 700 to 800 cases of fever in the town. The entire prostration of those suffering under the attack has been pitiable. Fortunately, the mortality is not proportionate to the intensely violent character of the fever. The disease has been extremely severe in all the principal streets and squares occupied by the respectable classes in North Shields, and in some of the best portions of Tynemouth; and there is the same disproportion in the number of cases in the higher as compared with the lower parts of the town as was seen during the cholera visitation, the humbler classes by the river side having again come off comparatively unscathed. This is a remarkable circumstance, and narrows the search after the cause of the alarming outbreak to very small proportions. The Falmouth case might usefully be considered in connexion with it. The origin of the disorder is believed to be found, however, in some sort of water pollution, and not in atmospherical conditions. The Public Health Committee have instructed Mr. Hawksley, C.E., to make a complete inspection of the water-supply of North Shields.

THE ANCIENT MANOR-HOUSE OF SOUTH WINGFIELD, DERBYSHIRE.

In your recent review of "Guide-books to Derbyshire" no mention is made of one of the most interesting and extensive ruins in that county. I allude to the Manor House of South Wingfield (or Winfield), three miles distant from Alfreton and about eight from Matlock-Bath. Allow me, then, to add to what you have said a few remarks on this charming old mansion, which, independently of its architectural features, possesses some historical interest as the place where the ill-fated Mary, Queen of Scots, was imprisoned for several years. To the traveller on the line between the Ambergate Junction and Chesterfield the ancient Manor House forms a striking object, standing out majestically amid a fine grove of trees, which almost embosom it, and surrounded on nearly every side by a deep valley. It is not exactly a castellated structure, but a specimen of a manor-house erected during the reign of Henry VI. (of the very early Perpendicular period; in fact, almost Decorated in parts), and fortified to some extent.

According to Camden, it was built by Ralph, Lord Cromwell, Lord Treasurer of England, and this statement is somewhat corroborated by the fact of carved bags or purses being introduced in the arms over the principal entrance gateway. The plan of the Manor House consists of two quadrangles, the northern of which comprises the more important rooms, the southern court having evidently been used for the inferior buildings. In the north wing of the former quadrangle are situated the banqueting-hall * (with a fine crypt, the use of which seems uncertain), having the usual arrangements of an entrance-porch with chamber over, and a bay-window of elegant design. Adjoining the hall to the west is a large room, probably the state apartments or refectory, beyond which are the buttery-hatch, kitchen, and other rooms, to which no name can with certainty be given. In the west wing, it is said, were the suite of apartments in which Mary Queen of Scots was confined. This is popularly believed to have been the most magnificent part of the building. The foundations of two bold semi-octagonal projections and portions of the walls still remain on the inner side of this wing. These are traditionally said to have been bay-windows, but the foundation is solid, and from an excavation I made some time since, resulting in the discovery of the jambs of an archway at the side of one of these projections, they appear much more probably to have been lofty *turrets*. At the south-west angle stands what is now termed the high tower. There are some persons still living who remember the fall of a tower of similar dimensions at the opposite (south-east) angle. On the south side of the north quadrangle (which forms the north side of the south court), are the porter's lodge, entrance gateway, and a modern farm-house, stable, &c., formed within the walls of the original structure. There are no remains beyond a portion of a wall, of the building which formed the east wing of the north quadrangle, but beyond to the east are the ruins of what was probably the chapel.

The south court was evidently used for offices. Its east wing consists principally of two large halls, which were probably barrack-rooms. At the south end of this side is an arched gateway; on the south is a barn, the greater portion of which is clearly part of the original design, and fragments of walling remain, sufficient to show that buildings extended along the whole length of this side of the quadrangle. On the west side the greater portion of the outer wall exists, and there are indications here of another external gateway. Till within about the last twenty years, the original well in the centre of the court was in use, but one night it suddenly fell in with a loud crash.

Nearly all the work is in capital preservation: some portions of the window tracery, door-jambs, &c., look as if only just from the mason's hands, so sharp and well defined are the arrises and mouldings. The more important part of the building is faced with ashlar, which I am told, on tolerably good authority, was quarried on Ashover Moor, about four miles distant from the Manor House: it is a crystalline millstone grit. The material for the rougher walling was obviously obtained on the spot, as the greater part of the south quadrangle is built on the solid rock (which is a formation of the old red sandstone). Blore, in his history of South Wingfield Manor (published in the last century), remarks: "Some assaults during the civil wars between Charles I. and the Parliament, and the more deliberate attacks of its subsequent owners, have brought it into a state of irreparable ruin." However, the present possessor of this property, the Rev. Immanuel Halton most fully appreciates the ancient building, and in a conservative spirit adopts every means to preserve and to strengthen it where necessary.* E. B. F.

* In 1678, this portion of the Manor-house was altered and adapted into a dwelling-house, the remains of which still exist.

* I must express my obligations for some of these data to Mr. John Cupit, of Wingfield Manor, who has resided there for some years, and takes the greatest interest in its antiquities.

BUILDERS' HARDWARE.

Mr. Rupert Kettle (County Court Judge), who, it will be remembered, was the chosen arbitrator of the Wolverhampton builders in the recent wages dispute, which he brought to a successful termination, has just been addressing the working people of Willenhall on the "Ornamentation of Flat Surfaces," with especial reference to the manufactures of the district. Mr. Kettle, after an elaborate criticism of modern house decoration, particularly cornices and wall papers, referred at some length to the design and ornament of builders' hardware. "Hinges," he said, "thanks to the design of ecclesiastical builders, had been more elaborated recently; but locks and keys, bolts, and window fastenings, still retain the utilitarian character of former times." He suggested that brass ornaments in the shape of corner-pieces on ordinary door-locks, would be simple and inexpensive decorations, and would greatly improve the appearance of those articles. One eminent firm in South Staffordshire (Messrs. Carpenter & Co.), have already begun to act on the suggestion, and are preparing for the London market a series of cheap yet ornamental rim and dead locks. The Wolverhampton co-operative locksmiths, who have quarrelled with their former employers, have applied to Professor Fawcett for assistance and advice, and that gentleman, in conjunction with other well-known advocates of co-operative industry, has expressed his desire, under certain conditions, to render the applicants "permanent aid." The demand for builders' hardware in Birmingham is improved further, and the workpeople are steadily employed. Builders' tools are especially in more buoyant demand."

PROPOSED FISH MARKET IN THE FARRINGDON ROAD.

Acting on the facts that upwards of 70 per cent. of the total supply of fish is now conveyed by railway, and that Billingsgate market cannot be made to meet all requirements, the Smithfield Market Appropriation Committee, entertaining strong convictions of the appropriateness of the land lying between the New Meat Market and Farringdon-road for the purposes of a fish market, have availed themselves of the professional services of Mr. Lewis H. Isaacs, architect, and have issued a plan showing the situation of the proposed market, and a view of the intended structure as seen from the Farringdon-road. The ground proposed to be utilized is a parallelogram, bounded on the north by the new road leading to the Charter-house; on the south by an intended new street in continuation of Long-lane; on the east by the new street now formed at the end of the meat market, and on the west by the Farringdon-road. In the design no attempt at originality in the external appearance of the building has been sought after; and, as far as it is practicable, the fish-market has been made to appear an addendum to the meat and poultry market. The cost of the building is estimated at 150,000*l.*, exclusive of the value of the land, which is the property of the corporation. The committee in their prospectus take credit for availing themselves of a fall in the land by forming a shell-fish market below, besides the basement below that again; but the result is to render flights of steps necessary to reach the market proper, which we are disposed to think would be found objectionable. However there are more vital questions to be disposed of before this need be discussed.

RE-OPENING OF PORTSMOUTH GARRISON CHURCH.

This event took place on Friday, the 30th ult., and was conducted with considerable ceremony.

The restoration of this ancient structure has been one of some difficulty. They found the old buildings in a wretched state, windows blocked up, doors also, members concealed or fractured, the tie-beams of the roof hanging by iron straps to the outer walls, rendering it quite a matter of wonder they had not dropped from their places long before. We read that the building was the only remains of "Domus Dei," or God's house, a kind of hospital originally for poor monks; and since then the place of marriage between Charles II. and the Infanta of Portugal, &c., to celebrate which, it is supposed, the monarch presented the altar-cloth in the possession of the church, and emblazoned with a view of Lisbon and the Royal arms of Portugal.

According to Matthew Paris, 1238, Peter de la Roche or de Rupibus was the founder of the Hospital of Portsmouth, in the W.S.W. portion of the town, about 1205. In Slight's History of Portsmouth, we find that on the authority of Dugdale, "Peter de Rupibus, Bishop of Winchester, founded at Portsmouth, in the reign of King John, a famous hospital called God's House, which was dedicated to St. John the Baptist and Nicholas." Camden and Speed are agreed on this point.

In the 20th, 37th, and 52nd years of Henry III., disputes were settled as regarded certain possessions. After several grants in 1272 and 1276, the two brothers of William of Wykeham were wardens successively. In the fourteenth century William of Wykeham himself bequeathed "a suit of vestments and a chalice."

In digging down, a broken column and portions of an archway were discovered, which proved that the proposed extension (which has been carried out) of the western end would terminate the actual original length of the building. 20 ft. have been added, making the dimensions as follows:—Nave, length, 110 ft.; width 45 ft.; height from floor to springing of roof, 32 ft. Chancel, including choirs,—length, 55 ft.; width, 22 ft.; height from floor to springing of groined arches, 25 ft. The new transept on the north side of the chancel is in length 18 ft.; width, 12 ft.; and height, from level of floor to apex of roof, 30 ft. The roof, which is open-timbered and tile-covered, forms as nearly as possible an equilateral triangle, king-truss for nave and queen-truss for chancel. Vaults lying concealed beneath by the deposits of centuries have been filled in, and a substantial bed of concrete, 6 in. thick, overspread by a layer of cement, ¾ in. thick, which will, in time, be covered by Minton's tiles, makes a dry and serviceable floor. Chairs, 750 in number, are placed in the nave. The nave, from east to west, is divided into bays, consisting of pointed arches, springing from freestone columns, and is lighted by twelve two-light windows, independently of the stained windows, which we shall describe further on. The chancel-floor is composed of encaustic tiling (Godwin's) interlaid with old white-veined marble, which formed part of the old structure, laid diagonally, and connected by bands of polished green tiling. In the chancel the old credence and sedilia have been restored, the mullions of windows partially so. The stained windows above the altar are three in number, and placed there in honour of Sir Charles Napier, of Indian fame, Lord Raglan, and Lord Clyde. The large window at the west end, over the main entrance doorway, is illustrative of Christ sitting in judgment at the last day, and is placed there in honour of the officers, &c., of the 43rd Regiment, killed in the New Zealand campaign. East of the south aisle is a small one-light window, placed there by Archdeacon Wright, one of the chaplains to the forces at Portsmouth, in memory of his brothers, bearing upon it full-length pictures of David with the head of Goliah, and Jonathan in battle array. South-east of the south aisle,—a small window, containing the figure of "Sanctus Georgius," in full armour, presented by Mr. A. Smith, the contractor for the building. On the north side of the chancel proper a two-light window represents the baptism and preaching of Christ, and is to the memory of Col. Willis. In the north-east corner of the nave is a three-light window exemplifying the child-life of our Saviour, comprising the offering of the Magi, &c., and erected to the memory of Capt. Molesworth, R.E. On the north side of the choir is a window to the memory of the officers, &c., of the 67th regiment. All these stained windows are by Messrs. Clayton & Bell, of London. The church is warmed by a central pipe running down the centre of the nave below the flooring, and terminating in branches to two Gill's stoves, situated respectively at the east and west ends of the north side of the building. The gaslight arrangements are effected by fourteen ornamental Mediæval iron standards rising from the floor, and carrying a total of 108 lights. These were all from the manufactory of Messrs. Hart & Son, of London. Mr. Street was the architect, and Mr. A. Smith, of Portsea (late Simms & Marten), the contractor.

MONUMENTAL.

A monument to the late Admiral Sir Charles Napier is at last in existence, but not so much on the part of the country, as it ought to have been, as on that of private friends and admirers of the bluff old admiral. The ceremony of unveiling this monument, which is one in relief, and fills a niche in St. Paul's Cathedral, near the north entrance, has just been performed. Among the company present were the following:—Major-general Napier, C.B.; Major-general W. Napier; Admiral Sir Michael Seymour, G.C.B.; Colonel Hamley, C.B.; Captain W. Napier; Captain W. Morris, R.N.; Captain Ingledue, Captain Norton Taylor, Captain Poulter, &c. The expense of this monument was defrayed by a few friends and companions in arms of the late admiral. It is of white marble, and upon flags are the names of most of his battles. In the centre is the head in bold relief, surrounded by a wreath of laurel and oak; in the background is the ship *Wellington*, gunboats, and a fortress blown up; beneath is the simple inscription, "Charles Napier, M.P., Admiral, Count Napier St. Vincent, born 1786, died 1860." The work was designed and executed by George G. Adams, sculptor, who has now five monuments in the cathedral, two being colossal statues of the admiral's cousins, Generals Sir Charles J. and Sir William Napier.

A memorial brass, in the Mediæval style, sunk in a black slab of Irish marble, has just been executed by Messrs. Hart & Son, of Brook-street, Hanover-square. This tablet is to the memory of the late and sixth Earl of Harrington, and is now being erected in Elvaston Church, near Derby. The slab is 8 ft. 6 in. by nearly 4 ft. The inlaid brass is delicately worked, the enamelled portions being effective, and the colours harmonising with the general design. The whole is bordered by texts and symbols. Under the canopy is a full-length portrait of the earl in collegiate attire. This memorial is being erected by Elizabeth, Countess of Harrington, mother of the deceased youthful earl, who died in 1866, before attaining his majority.

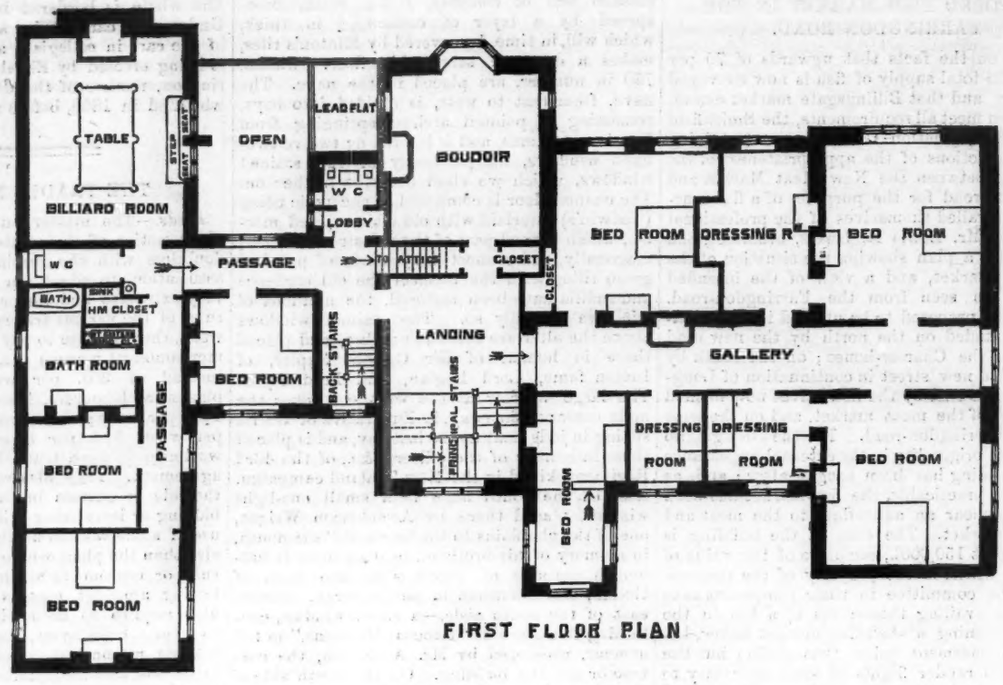
THE TRADES MOVEMENT.

Leeds.—The master builders of Leeds have given notice of their intention, in accordance doubtless with the resolutions of the general association, to adopt, on the 1st of May next, very extensive and important alterations in the rules of the various trades. Instead of 30s. per week, they propose to pay ordinary skilled workmen amongst masons 7½d. per hour; plasterers, instead of 30s. per week, 6½d. per hour; plasterers' labourers, instead of 22s. per week, 4½d. per hour; and plumbers, instead of 26s. per week, 5½d. per hour; superior or inferior workmen in each trade to be paid by special agreement. They also require the abolition of the rule or custom in the Masons' Society forbidding or interfering with the introduction or use of stone worked at the quarry, or anywhere else than the place where it is to be used. Any rule or custom forbidding piecework or subletting amongst masons and plasterers they also require to be abolished. With respect to the bricklayers, bricklayers' labourers, masons, masons' labourers, plasterers, plasterers' labourers, and the plumbers, the masters require that in future all trade rules, disputes, demands, and differences shall be settled by conciliation and arbitration [to "require" all differences to be settled by *conciliation*, we fear, is not the best way to effect such a settlement], and that proper courts shall be constituted for that purpose. They further state that they are prepared at any time, upon six days' notice from the men, to meet them to appoint arbitrators and select an umpire, and that they are willing to leave to the decision of the arbitration court, thus appointed, not only all future settlement of trade rules, demands, and differences, but also the settlement of all matters contained in the notice they have just given.

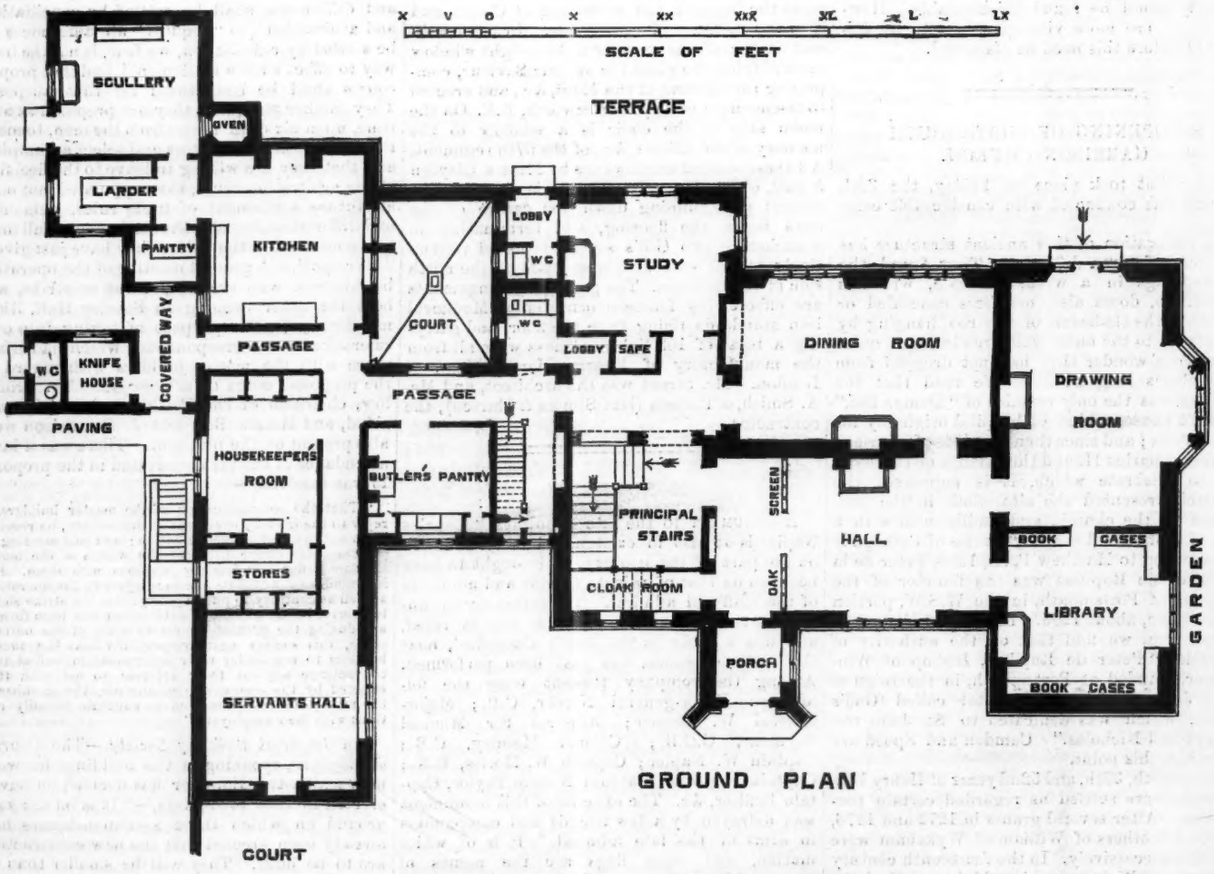
Liverpool.—A general meeting of the operative bricklayers, who are at present on strike, was held the other evening in Stanley Hall, Richmond-row, for the purpose of taking into consideration the correspondence which had taken place with the master builders with regard to the proposed court of arbitration. Mr. Bromilow, chairman of the Bricklayers' Society, presided, and Messrs. Bolt and J. Samuelson were also present on the platform. There was a large attendance of the men interested in the proposal. It was resolved,—

"That the communication of the master builders, in reply to the friendly overtures of this society, be received in an entire spirit of reconciliation; and this meeting expresses every desire to meet the wishes of the master builders and renew friendly relations with them. But, inasmuch as it would be a serious injury to the operatives, as well as contrary to public policy, that the strike should terminate before a court of arbitration has been formed, and during the present depressed state of the building trade, this society again respectfully asks the master builders to reconsider their determination, and at their convenience appoint their referees to act with those selected by the operatives; meanwhile, the members of the society are recommended to cultivate friendly relations with their employers."

An Imperial Building Society.—The *Courrier de Bayonne*, speaking of the buildings for workmen which the Emperor has decided on having erected in that town, says,—"It is on the same ground on which three specimen-houses have already been erected that the new constructions are to be built. They will be smaller than the preceding, and are intended for only one family. The Emperor, in order to carry out his philanthropic projects, is said to design purchasing all the lots composing the block on which the first three habitations have been constructed, and to pay the price which would serve as the estimate for putting it up to auction. Each dwelling is expected to cost 4,500 francs; the tenant is to pay 300 francs a year, out of which sum 100 francs will be set aside as a sinking-fund for the capital employed. His Majesty will give the property, it is said, to the Society of the Prince Imperial, which will select the occupants and collect the rents. At the end of fifteen years the inhabitant will become the owner. If, by any unforeseen event, he cannot pay the stipulated annual sum (which may be acquitted by monthly instalments), he will be reimbursed the 100 francs a year he has accumulated towards the redemption of his house, with the addition of 3 per cent. interest.



FIRST FLOOR PLAN



GROUND PLAN

MIDELNEY PLACE, NEAR LANGPORT.

MIDELNEY PLACE, NEAR LANGPORT, SOMERSET.

This house, which is of moderate size, has been built for a gentleman in Somersetshire. It stands on a gentle slope to the south-east, and this is the aspect of the principal rooms.

The porch, by which the house is entered, is at the back, and fronts a courtyard enclosed on the three other sides by walls, the direction of which is indicated on the ground plan, and by the stables. The approach is by an archway in the north-east wall of this courtyard.

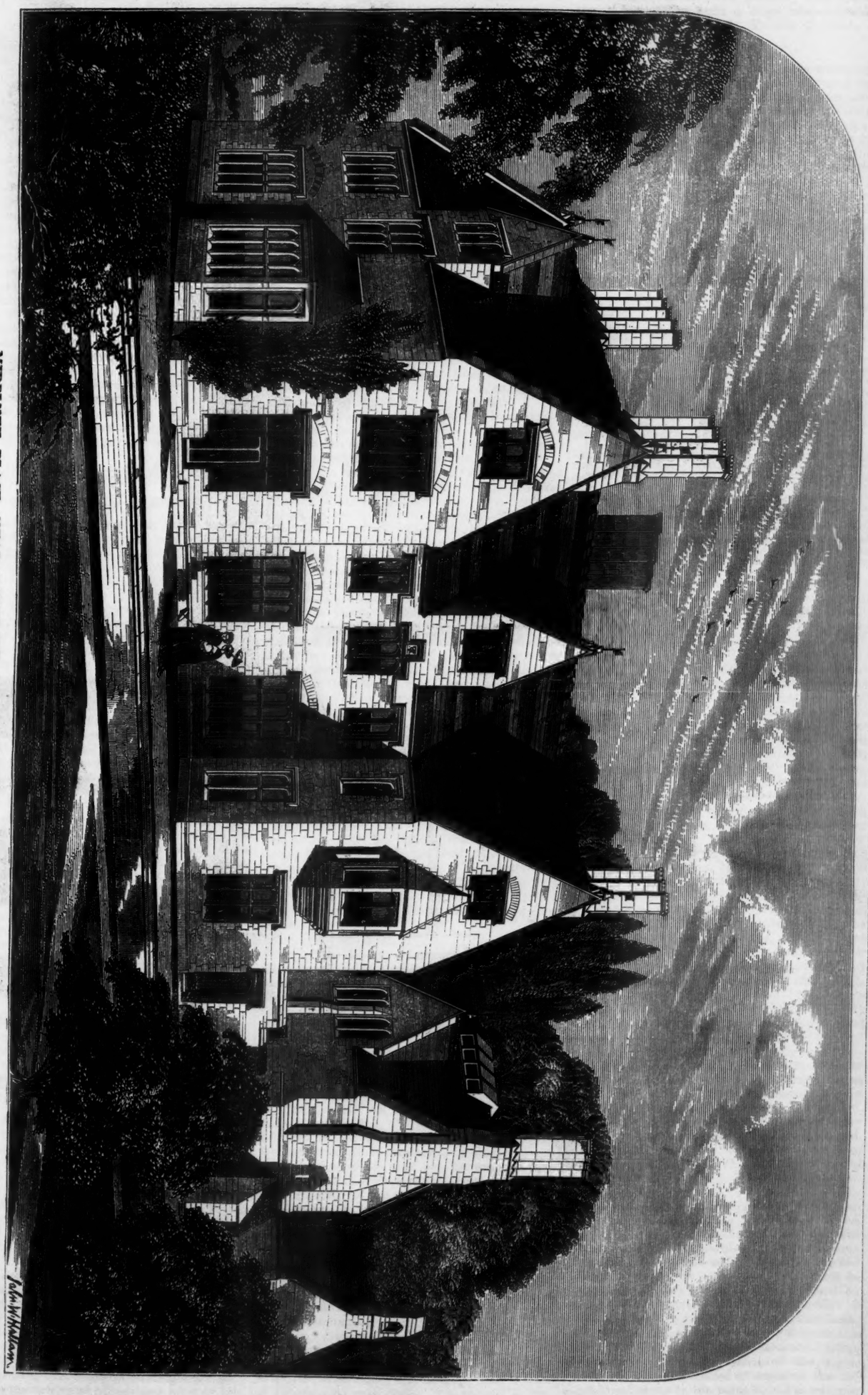
The house is built of the white lias of the neighbourhood, with dressings of Ham Hill stone, the distant quarries of which can be seen from the windows. The roof is tiled. The style has been followed, though scarcely hoping to attain their grace, of the numerous remains of Mediæval Domestic architecture with which the district is adorned.

The greater part of the hall is secured against the draught from the front door by an oak screen, 8 ft. high; and as the window faces the north-west the apartment thus formed makes an agreeable summer sitting-room. It is altogether 32 ft. in length, and, as also are the three principal rooms opening out of it, is 12 ft. high, and 18 ft. broad; the dining and drawing rooms are 29 ft. long each.

On the first floor, a handsome corridor, ending in a large western window, leads to the principal bedrooms: their height is 10 ft. Above, by spanning the valley between the two central ridges with a flat lead roof, spaciousness has been obtained in the attics. These rooms are all 9 ft. high. A billiard-room, over the kitchen, is lighted by a lantern in an arched timber roof.

The builder was Mr. M. Davis, of Langport; and Mr. J. P. St. Aubyn was the architect.

The tender for the house was 5,830*l.*, but by additions and variations the owner increased the amount to about 5,832*l.* The whole of the stone for the building was dug in the adjoining field. This and other advantageous circumstances materially lessened the cost. The cost of the house, if erected in the neighbourhood of London, has been estimated at more than 8,000*l.*



MIDELNEY PLACE, NEAR LANGPORT, SOMERSETSHIRE.—Mr. St. Aubyn, Architect.

WESTMINSTER ABBEY.

"I see the old Abbey, both turret and tower."

It was with thoughts of the past that I rambled around the noble pile of buildings which is the glory of the metropolis and of our land, and I longed for a Haussmann's power to remove the modern buildings by which it is hemmed in, in Dean's-yard and Poet's-corner, so that the abbey might be seen in all its grandeur. The chapter-house is being restored, but its beauty is hidden by the houses that stand between it and the Houses of Parliament. While examining the abbey, I came on to an ugly hoarding adjoining Henry VII.'s Chapel and the northern transept, used as a stonemason's yard (and it has been so for several years): and to my horror I heard a *steam-engine* puffing away as if it wanted to damage the abbey. The steam-engine appears to be close to the buttress of the northern transept. Surely it ought not to remain *for a single day*, for it has been publicly stated that with the extraordinary changes in the pressure of the atmosphere rife there is very great danger to steam-boilers, and the slightest carelessness of an attendant might cause much mischief.

I ask you to raise a warning note in the *Builder* ere it be too late. Surely the hoarding might be removed, and a stonemason's yard obtained very near, where the steam-engine might do its work without danger to any surrounding building.

E. O. S.

THE FAIRFORD WINDOWS.

Sir,—I venture to send you some remarks suggested by Mr. Clayton's letter on this subject in the last number of the *Builder*, not with any intention of discussing the possible connexion of the Dantzic triptych and the west window at Fairford, or the authorship of the former, but with reference to Mr. Clayton's observation that the canopies of the Fairford windows are distinctively Flemish in style.

I have the greatest respect for Mr. Clayton's authority on any point in connexion with glass-painting, and it is with an honest and unaffected sense of his knowledge and my ignorance on the subject, that I ask him in what particular the canopy-work of the Fairford windows is distinguishable from Nuremberg canopy-work of or about the same date? I would also ask Mr. Clayton if he has compared the figures in the Fairford windows with those in the windows of Cologne Cathedral ascribed to Albert Dürer; and if he has minutely examined the tower architecture in many of the backgrounds of the Fairford windows? My own impression from such examination was, that much of these details was actually taken from the walls, gates, and towers of Nuremberg itself. I do not say positively that this is so; but I mention my impression, because it strikes me that careful examination of the architectural details of these backgrounds might be useful as throwing light on the origin of the windows. I have been out of town, and so have had no opportunity of seeing the letter of Mr. Waller to the *Builder*, referred to by Mr. Clayton.

Tom Taylor.

*** Having enabled Mr. Clayton to see the foregoing, that gentleman writes hastily:—

"Canopy-work of Düreresque treatment can be best and abundantly seen in Dürer's authenticated works, where the contrast with that of Fairford will be at once apparent. The difference will be seen in the great exuberance of curvilinear forms and foliated detail of the former, as against the verticity and comparative simplicity of the latter.

At the meeting of the Archæological Association, on Friday, the 6th, when the Rev. Fuller Russell read his paper against Dürer's authorship at Fairford, such good judges as Mr. Waller and Mr. Oldfield spoke in favour of the possibility of some of the canopies being *English!* so little of Nuremberg character did they see in them.

No institution of comparison between the figures at Cologne and Fairford would evidence anything in the question, unless it be first *proved* that the Cologne figures are by Dürer! Are not these, too, of doubtful authorship? When this matter is settled the Fairford glass may be considered in that connexion.

The architectural backgrounds might probably resemble the towers of Nuremberg, more or less, as they do those of any old city full of gables and sharp high-pitched roofs, towers, &c. If Mr. Taylor can say distinctly that Nuremberg in particular is so represented in the Fairford backgrounds the point would be interesting, but, even then, not conclusive in favour of Dürer or any German origin, as it would be easier to suppose a reminiscence of the city on the part of a Flemish artist than that a German designed all the rest of the work in a Flemish manner."

CONCRETE HOUSES.

Sir,—Those who may adopt this method of building should be careful to procure good and sound Portland cement, and to put in sufficient to bind the rubble or ballast together. To insure this the quantity used *must be regulated* by the strength of the cement.

In this the secret of success, I believe, entirely depends. I have already built six cottages one story high with concrete, and I have been so satisfied with the result that I have now commenced to build a dwelling-house with the same material. The walls of the cottages are only 9 in. thick, but are I believe stronger and drier than if they had been 14-in. brick walls. The Portland cement has, however, been used in sufficient quantity, and has been good.

I have not employed Tall's or any other *patent* apparatus, but merely boards. My reason for doing so was simply that I considered the cost of the patent apparatus excessive.

As to the strength and stability of concrete as a building material there can be no question. General Gillmore, in his work on "Limes and Cements," says, in regard to it (para. 447), that "It is superior to brickwork in strength, durability, and economy; and in some exceptional cases it is considered a reliable substitute for the best stone, while it is always preferable to the poorer varieties." And the late Mr. Robert Stephenson, in his evidence before the Committee of the House of Commons on Westminster Bridge (18th July, 1856), stated that he had examined the concrete of which the foundations of the new bridge were made, and "that it was a great deal harder than the stone of the old bridge, or than it ever was," and added "there is no chance of any decay taking place there."

Some of the old churches in Kent, I have been informed, are built of concrete, and are in excellent preservation to this day; but to give more recent instances of its use, and which many of your readers can examine for themselves, I may mention that part of the retaining walls of the Metropolitan Railway (between the Aldersgate and Moorgate-street Stations) are made of concrete, as also near the Baker-street Station on the St. John's Wood line; and, lastly, there is a concrete bridge across the District line near the junction at the Gloucester-road Station. It would be both interesting and instructive if the engineer by whom this bridge was built would give an account of it in your paper.

W.

Sir,—The liability of concrete to crack and disintegrate, evidently increases in an enormous ratio to the size and dimensions of the wall, and the error of all its advocates lies in the supposition that, because it might answer well enough for a low wall, it will answer equally well for those of a lofty building. There is another point respecting concrete walls that has to be carefully attended to. In a word, when you want good concrete, to use a common phrase, "see that you get it." There is good concrete, and there is bad, the latter being nothing better than so much dirt, the employment of which will end in the collapse of the whole concern. We know that it is impossible to obtain in the mass those qualities that can be ensured in a smaller amount of the same material. Cast iron is an instance of my meaning. Moderate-sized castings can be turned out of the foundry in a perfectly sound and reliable condition, but these conditions cannot be guaranteed when the mass of metal passes certain dimensions. So it is with concrete, the proper duty of which is to act under pressure, as in foundations, where its sphere has been one of great utility and value. I do not mean to assert that concrete may not be applied to the building of walls, but I contend that, until some method is introduced which shall impart to it the qualities in which it is at present deficient, it will prove a failure in all instances where it is adopted upon a scale of comparative magnitude. I have used it myself as an adjunct to brickwork in retaining walls, where it answered perfectly well, but I should hesitate to build a large retaining-wall altogether of concrete.

Thomas Cargill.

I have, amongst many others, been watching closely the progress of concrete as material for building, and was much pleased with the article in your pages on Portland Cement. I lately heard, accidentally, that at Gibraltar the Royal Engineers engaged some Moors to assist them in mixing concrete, from whom they learned the proportion of sand or other material, and other information, by which remarkable consistency was given to the mixture. Perhaps some of your readers may be able to furnish us with information on the matter.

Inquirer.

CONCRETE HOUSE AT TWICKENHAM.

Sir,—I wish to notice one paragraph of Mr. Tall's letter in your paper of last week.

He states that the cement supplied to Dr. Larden, at Twickenham, was of the "very worst description." This I must distinctly deny, and, fortunately for me, who supplied it, the garden walls, which are now standing, show the falseness of his statement, and will prove to any one who sees them that no cement could be better. There is also the fact of the concrete holding together in large blocks after it had fallen from a great height, which it would not do if the cement were bad.

I think the fault in building concrete houses is in expecting the cement to go further than it *safely* will do.

In Dr. Larden's house, the proportion of cement to ballast was about 1 in 10, which is certainly not sufficient to be depended upon; in addition to this, there was the deficient construction of the walls, the total absence of bond or tie, the bad foundation, and the running up the building in too short a time to allow the work to set properly (and all good Portland cements are very slow in setting), which I think fully account for the falling of part of the house.

I may add that the house at Ealing, which has stood well, was constructed with my cement; and that the clerk of the works of both this and Twickenham is still being supplied by me.

Archi. Little.

TO PRESERVE A SCALING OR CRACKED PAINTING.

Sir,—I understand that Mr. Holman Hunt has written a letter from Florence on the present condition of the renowned picture known as "Titian's Venus," and that he states "it is free from the sacrilege of 'retouching,' except near the frame, where the flakes of colour which have fallen off have been replaced as well as possible. But the whole picture is covered with cracks, radiating like cobwebs from various points, and circulating all over the canvass. The entire surface of colour hangs therefore in little scales, which are in danger of being shaken off or shifted by even the most careful moving or brushing." I have no doubt that there are many preservatives well known to those engaged in the art and science of restoring paintings; but having myself discovered a simple preparation which possesses the property of fixing the colours of pictures when they are in a state to chip or scale off from the canvas, as pointed out by Mr. Holman Hunt, I think it may be worth publicity. The preparation is a mixture of equal parts of linseed oil and methylated chloroform. It is to be poured over the painting if the colours are too brittle to bear the friction of a soft brush. After remaining on the surface of the painting for a day or two, the excess of oil may then be removed by means of a piece of cotton-wool, or a soft brush, and a fresh portion of the preservative applied, and the excess removed as before. The process must be repeated from time to time until the colours are firmly fixed, when the painting will bear friction, and may be submitted to the cleaning process or varnished. It is advisable, however, to remove as much of the dirt as possible from the picture, by careful washing with soft water, previously to the application of the fixing agent.

In order to illustrate the value of the preparation I experimented, some years since, on an old oil painting, and accidentally removed the oil and turpentine with which the colours were originally mixed by the artist, thus causing the colours to crack all over, and to fall off in minute pieces when the painting was raised on its side. To prevent further destruction I flooded the painting with the oil and chloroform, and soon found the colours firmly fixed to the canvas, and presenting the appearance of being varnished, owing to the action of the atmosphere and the combination of some of the old varnish embedded in the painting. I sometimes use a mixture of one part of methylated chloro-

form and two of linseed oil for reviving the colours of paintings. A small portion is rubbed over the pictures, after washing, with cotton-wool, and on the following day the painting is wiped over with a soft silk handkerchief. I have found the oil and chloroform, when used in the proportion which I have given, to possess the property of restoring the faded colours of paintings, and I have succeeded in developing colours which had perished, to the eye, by age. It is said that peroxide of hydrogen possesses this property; but I found it to fail when the oil and chloroform succeeded.

In conclusion, I would mention that the methylated chloroform which I have used is the English manufactured article, which differs in some respects from that of the French, though the latter may answer the purpose equally well, but care must be taken in regulating the quantity of oil required for dilution. I believe it would not be safe to use more than equal proportions, even of the English methylated, as there would be some risk of starting the colours or causing diffusion. Lastly, I would suggest that linseed oil and chloroform might be advantageously used by artists for mixing the colours for painting instead of oil and turpentine or varnish.

I wish it to be understood that the fixing agent will not restore the cracks in a painting, but simply fixes the colours, and renders the painting, I have sometimes found, as elastic as the oil-cloth table coverings.

I have now tested the process over a period of three years or more, but my opportunities have been very limited; nevertheless, I think the preparation may be worth the attention of your readers.

HENRY OSBORN, M.R.C.P., &c.

PAINT FOR HOT METAL.

SIR,—Having seen the answer your correspondent from "Sussex" gives to a "Subscriber's" question regarding a paint for hot-water pipes, I beg to inform you that the waterglass paint to which he refers may be obtained from Messrs. Keilan & Gummi, at Nussdorf, Vienna, Austria. About ten months ago I saw at Vienna a sheet-iron stove, which had been continually at a red heat during the cold season, and the waterglass paint, with which it had been covered for a period of more than twelve months, had preserved its colour unfaded, in spite of this severe test. Allow me further to state, that the waterglass paint has been, to my own knowledge, successfully used at Vienna, in places where no description of paint could have withstood the effect of the weather.

The various paints may be had at the above-named place, at prices ranging, according to colour, from 1*l.* to 6*l.* per cwt.

H. WINKLER.

THE ARMOUR AT SOUTH KENSINGTON.

SIR,—It was with a great deal of pleasure that I saw the announcement in your publication that Meyrick's beautiful collection of armour is to be exhibited, on loan, at South Kensington. Now, I think, a happy time has arrived, and that with the kind help of collectors, such as the Marquis of Westminster, Lord Londesborough, Lord De Lyle, Mr. Maniac, and others, together with the assistance of the Government from the Tower, and the crown from Windsor Castle, a few lines from your able pen, and the aid of Mr. Planché and Mr. S. Pratt to arrange it, a more perfectly historical and chronological exhibition of armour than was ever seen before could be made. I do sincerely hope the good chance of so very interesting an exhibition may not be lost.

H. W. TUCKER.

THE COSMICAL DISTURBANCES OF THE EARTH'S CRUST.

SIR,—I have read with great interest your remarks upon the above subject, it being one upon which science has little condescended, as yet, to enlighten the vulgar mind. Scientific investigation is, unhappily, at variance with theological exegesis with regard to various portions of the revealed Word which are supposed to embody secular facts; the reconciliation of these may be curiously dependent upon the question of the permanent or varying dimensions of the earth's diameter.

The theory of the gradual expansion of the earth has been more than once brought forward, but always to be overborne by the weight of astronomical assumptions. Yet, more than one astronomical and geodesical difficulty remains, from which this theory affords apparently a means of escape.

There is a singular absence of data from which to deduce conclusions respecting the direction and extent of primary disturbances, which can only be supplied by sections, through large areas of the globe, showing the profile of the schistose formation as it at present exists. These, accompanied by borings in those portions of the formation which are sufficiently exposed, and by careful thermometrical observations, would probably lead to a closer acquaintance with the processes by which the different strata were arranged, and with the mode in which they have been made to regulate the effects of internal forces. We might then, perhaps, arrive at satisfactory conclusions respecting these forces themselves.

F. H.

A PLEA FOR THE TOWN CHILD.*

CHILD of the Town! for thee I sigh;
A sombre roof's thy golden sky,
Thy fragrant air is thick with smoke,
It is thy shroud and mourning cloak.
Alas! poor child, thou art confined,
At once from sun, and light, and wind.

Child of the Town!—'tis sad to sing
Of such a rank and noisome thing—
Thy home is foul, nought there is fair,
Sweet life and joy are unknown there.
Alas! poor child, thou art confined,
At once from all that's pure and kind.

Child of the Town! thy danger's great
When thou attempt'st to cross the street.
Thy groves and hills are bricks and tiles,
And rough's thy path for miles and miles.
Poor child! *they* should ram ground and stone
By steam, and not by men who groan.

Child of the town! for thee, alas!
The *Boards* won't plant nor trees nor grass;
Nor gully smell, nor choking sewer,
Will they prevent, or try to cure.
Alas! poor child;—care for his health!
It is his all—his strength, and wealth.

* *

* See Allan Cunningham's poem of "The Town Child and the Country Child."

LOCAL BOARDS AND OTHERS *v.* PRIVATE PRACTICE.

SIR,—I beg to inclose herewith an advertisement, cut out of a Yorkshire newspaper, inviting engineers and architects to offer themselves as candidates for the office of surveyor of bridges to the North Riding of the county of York. You will see, sir, that the salary offered is 300*l.* a year, and no expenses whatever are allowed. The duties are various, and their name is legion; also that the officer appointed is to give the whole of his time, and is debarred from any private practice whatever.

Seeing in the *Builder* of last week a list of the salaries of twenty borough surveyors, and that *only two out of the twenty are permitted to have private practice*, I beg to offer a few remarks upon that system. I trust I shall not be considered to be encroaching too much on your space with a subject which is of such importance to so many gentlemen of the architectural and engineering professions.

I need not say that the above is quite a munificent salary compared with many we see under similar restrictions; but, sir, why should a county or borough surveyor be hampered in this manner? Surely the employers have their remedy if the employed should neglect his business, by their intimating to him that, if he continues his neglect, he must give up his berth; and if it be worth his while to accept an appointment of this kind, it is worth his while to keep it, and not to neglect its duties. But, certainly, if he can find time to design or superintend other work in the neighbourhood, I say it is very unjust and illiberal policy to prevent him.

I know a gentleman who was a county bridge-surveyor for over twenty years, with more than 300 bridges to visit twice a year, with frequent additional visits, and meetings of magistrates to attend, in a large county. The magistrates of that county were more liberal, and allowed him to do other work, thereby enabling him to make a living by combining his bridge-surveying with the superintendence of other local work he may have had in hand, as it was impossible otherwise to make both ends meet with the small salary (500*l.* a year, including all expenses) and excessive travelling expenses. This gentleman held also an appointment as a city surveyor, and likewise designed and carried out many engineering works in that part of England during a period of more than thirty years, and neither his employers in the county nor the city had ever cause to regret their liberality, and on his retirement a few years since no one could say that he ever neglected the duties of the one appointment for the other, or either for his private practice. Now, what kind of a county surveyor do they expect to get for North Yorkshire? Certainly no one who has any opinion of his abilities could accept such a post. Perhaps the "justices" do not wish to have a man with any opinion of his abilities, but would prefer a gentleman with no opinion, who would defer entirely to the justices' abilities! Were it not for these restrictions, there are many clever engineers (considering in what a stagnant state the profession now is) in North Yorkshire, I have no doubt, and many out of Yorkshire, who would be glad to offer their services, and even reside "*within three miles of the Court-house at Northallerton*," if they saw any chance of rising in their profession by constructing other works. It may be said that in many of these appointments, if an engineer or surveyor shows that he can do other work without interfering with his duties, after a time he is often allowed to take private practice. It may be so; but still it prevents many young men of ability from offering themselves for these berths, and is, I consider, a great stumbling-block in the way of young men by whom I should like to see these offices held, being positions with a certain income, while they were stepping-stones to the higher branches of the profession. This may be said to be a very Quixotic view of the matter. However, I think that engineers and architects will agree with me in wishing that a state of things existed different from that which I have deprecated, and also in believing that were it so more competent men would often hold these minor appointments.

It may be objected that the heads of the professions would go in for these berths, and that the youngsters would stand no chance against them; but the former would soon find out that they were no *sinecures*, and that they would not pay them for the keeping. I have alluded here only to the North York county surveyorship, but the same remarks will apply equally to any of the many appointments as surveyor to local boards, highways, &c., which we see advertised.

Of course, in the case of the more important appointments, and where in such cases as Halifax, Bradford, &c., waterworks and gas are included in the surveyor's duties, it would not be possible for the engineer to devote any of his energies or time to private practice, as he would be entirely occupied with his duties. But where the salary is insignificant, as in small towns and districts, or such appointments as county bridge surveyorship, I do say that it is a bad policy to restrict a man from accepting private practice.

CIVIL ENGINEER.

GENERALISATION IN ARCHITECTURAL EDUCATION.

SIR,—My letter seems to have stirred up a very muddy pool, and I have to thank you for having exposed the filth more fully and in better language than I could possibly have done. I was sorry you thought my letter "rather melancholy and desponding;" for I feel sure that there are many poor fellows who have not had the good fortune to be articled to as good a master as mine was. It is the rottenness of the *system* of pupilage, and of the system so common among a certain class of architects, of making pupils do the work of assistants, that I complain. Every one who desires the welfare of the profession is striving for something better; and I trust that, ere long, some brave spirit will break loose from our present narrow cage, and lead a grand charge of noble men against the mass of ignorance which lurks beneath the name of architect.

We see "our Continental neighbours" systematically educating young architects; and are we, without a desperate struggle, to allow them to ride over our heads?

I trust that this matter of education will never be allowed to rest until something really permanent is *done*. A great deal has been said, but where are its fruits? Some young men have been awakened, perhaps, but we want more: we want to see them clamour for reform, and we want to see a body of the ruling spirits of the profession put themselves into such an attitude that we may be sure that reform is coming.

The present *non-system* has worked *enough* harm: it has wasted enough precious time, and turned out enough useless men. Reform is in the hands of the sufferers, and I trust they will fearlessly strive for it till it comes.

We, like certain reformers of the present day, cry for disestablishment, but must look to older men for a new and enlightened system, believing that their love for that profession to which they have bound their lives will carry them through all difficulties.

But let all young men remember what Mr. Spiers said in his presidential address at the Association, about the little use made of the present means of education; and let us show that we are determined to do what we can with the means we have; for until we do this we cannot expect better things. If anything is done its success will depend upon the amount of patronage it receives, and I trust its failure will not be brought about for want of this.

I have to thank "A Subscriber" for his letter last week, and trust that many correspondents will, as he suggests, come forward and help us.

ADELPHI.

MAGNESIUM LIGHT.

SIR,—Is there any person who undertakes to light public buildings by means of *magnesium*?

A. M. M.

RATING THE STANDARD THEATRE.

Douglass v. St. Leonard, Shoreditch.—This was an appeal at the Middlesex Sessions, November 9th, by the proprietor of the Standard Theatre against three rates made by the vestry of St. Leonard, Shoreditch, in January, April, and July of the present year, on the ground that he was unfairly assessed to a larger amount than the real net value of the premises. Mr. Douglass has been for a long time a successful theatrical manager, and when his theatre was destroyed by fire in 1866 he rebuilt it on a much larger scale. He purchased two houses in George-street and three houses in Holywell-lane, besides enlarging the superficial area by other arrangements, and when the new theatre was opened in November, 1867, it was found to be capable of receiving 5,000 visitors. The vestry assessed it at 1,200*l.* net annual value, exclusive of the five houses; and upon Mr. Douglass making complaint, it was arranged that Mr. Castle, a surveyor versed in rates and values should carefully consider the facts and state the amount to be assessed. Accordingly, in the July rate the net annual value was entered at 800*l.*; but Mr. Douglass refused to be bound by the understanding referred to, and hence these appeals.

There were technical difficulties in the way of the appellant getting his case heard at all, and it was arranged by counsel that the vestry should reduce the rates to a uniform sum for theatre and houses—viz., 800*l.*—and that Mr. Douglass should bear the costs of the appeals.

FALL OF HOUSE AT DEVONPORT. — Part of a house building at Morice-town, Devonport, fell suddenly a few days ago. Several persons were near the spot at the time, and eleven were buried in the ruins. Mr. Oliver, a master builder, was killed, and six others were injured.

CHURCH-BUILDING NEWS.

Church Stretton.—The church of St. Lawrence has been restored and reopened. The new works completed consist of additions to the north and south transepts, both as side aisles opening by arcades into the transepts and nave, the clearing out, concreting, and reseating of the area, removing the plastered ceilings and wall coating, cleaning and pointing the walls and masonry, recovering the roof, building parapets to the four old gables, reflooring, and effecting general repair and cleaning. The additional buildings are wholly of masonry, the walling dressed on both sides. The roofs, of selected pitch pine and English oak. The fittings in the church and chancel are of English quarter oak. The floor tiles are 4-in. encaustic in patterns; the chancel and altar space of figured tiles. The style adopted in the additions is varied to suit their relative requirements and surroundings. Thus the low lean-to of the north aisle is thirteenth, and the south aisle, which is gabled, follows the fourteenth to the fifteenth century work. The old roof of the nave, dating back to the thirteenth century, is particularly fine; the "couples" unusually massive, each rafter being 9 in. by 8 in., and set at 9 in. apart upon wall plates. The roofs of the north transept and chancel are also on the framed couple principle, but less massive than the nave. The work has been effected from the designs and under the superintendence of Mr. Pountney Smith, of Shrewsbury. The contractor is Mr. Pugh, of Hungerford, Much Wenlock. The total cost of the work is about 1,500*l.*

Hempsted.—Alterations have lately been carried out in the church here by which its interior arrangements have been completely renovated. The old high pews have been replaced by open sittings. The pulpit, reading-desk, and clerk's seat—which rose tier upon tier, in the old three-decker style, completely excluding the chancel from the view of those sitting on the north side of the church—have been removed, the prayers and lessons being now read from desks at the end of the chancel seats, and a simple open pulpit having been fixed against one of the pillars which support the central tower. The chancel has been paved with encaustic tiles of a quiet pattern, and raised by two broad steps of Forest stone. The heavy wooden railing which enclosed the communion-table has given way to a single rail of polished oak, supported by iron standards. The cost of the alterations has been defrayed, and a harmonium provided, by the subscriptions of the rector and inhabitants. The alterations were effected without closing the church for more than than three Sundays, during which the necessary painting and graining were completed. The carpenters' work was entirely executed by a mechanic (Charles Wilson), living in the village. The paving, masons' work, and altar rail were provided by Messrs. Wingate. There are in this church several monuments to the Lysons family, to which a large part of the parish belongs. Closely adjoining the churchyard is the site of an early Roman camp, of which traces are clearly visible, and "Our Lady's Well,"—a spring covered by a porch, on which is sculptured a rude image of the Virgin. The parish boasts of a very ancient stone cross, the upper part of which was recovered some years ago from the bottom of the Severn, to which some zealous iconoclasts of former years had consigned it.

Rawmarsh (Yorkshire).—There is a movement for the restoration of Rawmarsh Church. With a view of carrying out the main object, that of rebuilding the tower, a voluntary church-rate of 6d. in the pound has been laid at a vestry meeting, and it is anticipated that sufficient money will be raised towards carrying out the desired object. The architects appointed to prepare the necessary plans are Messrs. Blackmoor & Mitchell-Withers, and under their inspection the demolition of the tower, which has recently shown further symptoms of instability, will shortly commence. Such is the insecure condition of the tower that for some time past it has been considered unsafe to ring the bells in the usual way. Along with the rebuilding of the tower will be carried out the work of restoring the interior of the church, the cost of which has already to some extent been provided.

Bingley.—The newly-erected church of Holy Trinity has been consecrated by the Bishop of Ripon. The site is at Dubb, on the high ground between the canal and the railway; and the parish assigned to the new church divides Bingley in two. The church has been built from the designs of Mr. Richard Norman Shaw, of the firm of Nesfield & Shaw, London. The style of architecture adopted is very Early English, with some traces of Norman. The cost has been 5,000*l.*, exclusive of a tower and spire, which will at some future time be built over the chancel. Mr. Forster, of Bingley, was the contractor for the works.

Sutton-in-Ashfield (Notts).—The parish of St. Mary's Church, of Sutton, has been restored, and re-opened, so as to accommodate a greater number of people. The church, which, in its late form, was probably erected about the end of the fourteenth century, had arrived at such a state of decay and disfigurement as to be not only unfit, but absolutely unsafe for public worship. The plans for the restoration contemplated the removal of the chancel eastward, so as to increase the length of the nave and aisles; also the erection of an organ-chamber and vestry on the north side of the chancel. This extension had to be abandoned for want of funds. The tower and spire, the latter seriously damaged by lightning last year, still remain to be restored. The whole of the galleries have been removed, and increased space has been obtained by widening the aisles and extending them westward on each side of the tower. Abundant traces of a much earlier structure were found in pulling down the walls of the aisles, and some interesting but mutilated drawings and inscriptions in distemper were discovered under the numerous coats of whitewash on the old walls. The defaced and dilapidated portions of the bases, shafts, and capitals of the columns have been exactly restored, and the whole of the colourwash from the ashlar-work has been chiselled off. The open roof and also the new benches throughout the nave, aisles, and chancel are of deal, stained and varnished. The windows are glazed with cathedral glass. The pulpit, — a gift of the parishioners in memory of the Rev. W. B. Stevens, the late incumbent,—is of stone. The cost of the restoration was about 1,600*l.* Messrs. Fisher & Sons, of Mansfield, were the contractors for the builders' work; Messrs. Haden, of Manchester, for the heating; and Mr. Rhodes, of Nottingham, for the gasfittings. The whole of the works have been completed from the designs and under the direction of Mr. C. J. Neale, of High Oakham. This restoration, commenced in February last, is mainly due to the energy and zeal of the Rev. Charles Bellairs, the present incumbent, who, by himself and his relatives and personal friends, has contributed a very large proportion of the funds.

Hessle.—A formal commencement of the work of restoring and enlarging the parish church of All Saints, at Hessle, has been made by the laying of the corner stone by Lieutenant-Colonel Pease. The contractors are Messrs. Simpson & Malone, and their contract for the whole work required to be done, including the erection of the chancel, is 5,548*l.*; contract for work at present in hand, 3,430*l.* 2s. The estimated cost of the north and south aisles is 1,058*l.* 19s. respectively. It has been proposed to take down the chancel, with its aisles, and the chancel arch and east end of nave, and rebuild them 25 ft. 6 in. further eastward, lengthening the nave to that extent by building two new arches on each side of the nave arcade, and by taking down the north and south aisle walls and widening the aisles, the present aisles being only 7 ft. wide. The alterations contracted for at present embrace the removal and rebuilding of the chancel and its aisles, and the lengthening the nave as at first proposed, and the building (to the extent of the addition) the aisles to the width originally intended, so that at any time, should the committee be provided with funds, the continuations of the aisles can be carried out. The work at present contracted for will give an additional area to the church of 1,785 ft. The restoration and enlargement are being carried out under the superintendence of Mr. R. G. Smith, of Hull, architect. During the removal of portions of the fabric several relics of Norman work have been discovered, also a corbel with a representation of Sagittarius carved thereon, and suggesting the existence of a former church, probably erected in Stephen's reign.

Moreton.—The restoration of the chancel of the church is now finished. In 1865 Mr. Chancellor, of Chelmsford, substituted open seats in the place of pews, and put down new tiles, &c. A window which had been covered up for many years was restored at the east end. Under a thick coat of whitewash the remains of mural paintings were discovered, probably of the same date as the church itself, viz., Early English, A.D. 1189, 1272, Richard I., John I., and Henry III. A copy of this painting was preserved for future restoration, but this could not be done until the walls were perfectly dry. The work has been done by Mr. Lee, of Lutterworth.

Leamington.—The new public cemetery in the Whitnash-road is now completed. It comprises fourteen acres of land; and two chapels, in the Norman style of architecture, have been erected, one for Episcopalians and the other for Nonconformists. The chapels were designed by Mr. G. W. Cundell, of Birmingham, and have been erected by G. W. Green, of Leamington. The total cost of the land and building will be about 8,000*l.*, which have been borrowed on security of the poor-rates of the parish.

Heanor.—The church in this place is rapidly progressing towards completion. The whole of the church has been rebuilt, but the old tower has been untouched. The edifice has very little ornament, excepting some stone-carving on the corbels in the chancel and round the spring of the arches. The old monuments have been restored. A memorial window, which was in the former building, has been placed in the north aisle, and another has just been put in the chancel by Mrs. Ray, of Heanor Hall, to the memory of her son and daughter. For the warming of the church an apparatus has been presented by Mr. F. Wright, of Osmaston Manor, the patron of the living.

Pleshey.—The church here has been re-opened. In designing the restoration it was determined to adhere as closely as possible to the architecture of the original church, built by Thomas of Woodstock, Duke of Gloucester. Such portions, therefore, of the original edifice as were sound, and which were principally confined to the lower arches, the ringing-chamber of the tower, and portions of the transept, were repaired and restored, the roof being renewed and the external walls stripped of plastering and the pebble facing repaired. The nave and aisle walls were refaced with pebble work, and new open timbered roofs added, and the upper part of the tower was taken down and rebuilt in character with the lower part, with parapet and lead flat roof. The original ascent to the bell-chamber being by a series of huge ladders fixed in the north transept, and consequently very unsightly and very much in the way, it was determined to construct a staircase turret at the north-east angle of the tower. Two-light windows have been introduced on either side of the nave, with a three-light west window, and a four-light window has been put in the chancel. The north wing of the nave is protected by an oak porch, and a vestry has been added to the south side of chancel. In consequence of the tombs to the Tufnell family which are put up in the chancel no side windows are there introduced. The whole of the external walls are faced with the pebble-work of the original church, which was found in excavating the nave and transepts; the windows, doors, copings, &c., being executed in Bath stone. As regards the internal arrangements, the nave is fitted with open benches, with paved gangway. The organ is set up in the south transept with the children's seats surrounding it. The north transept is left without benches, and both transepts are paved throughout. The font is new, with red Mansfield stone shafts and white stone base and top. The east window is filled with painted glass to the memory of the late Mr. John Jolliffe Tufnell, and the west window is filled with painted glass to the memory of the late incumbent, the Rev. James Hutchinson. The south window of the transept is filled with painted glass, the other windows throughout being glazed with tinted cathedral glass in patterns. Rimmington's heating apparatus has been adopted. The restoration has been carried out under the superintendence of Mr. Chancellor, architect, by Mr. James Brown, of Chelmsford and Bocking, builder.

Bradwell.—The new church, dedicated to St. Barnabas, in this village, has been consecrated. The edifice is built after the designs of Mr. C. C. Townsend, of London.

New Shildon.—The Bishop of Durham has consecrated a new church, dedicated to All Saints, and also a burial-ground, at New Shildon. The church stands on high ground, about a quarter of a mile south of Shildon, adjoining the Redworth turnpike road, on a site of an acre of ground given by the Earl of Eldon, who has also granted a similar quantity adjoining for a parsonage house. The building is designed in the Early Decorated style of architecture, with a good deal of the Early French character about it.

In the clock chamber will be placed a clock with illuminated dial, and machinery for striking the hours and quarters on bells in the belfry. The clock and bells are promised by Mr. Pease, of Darlington. The seats, which provide accommodation for 400 adults, are all open, with low standing backs and moulded standards. The churchyard is surrounded by walls and railing, and is laid out with paths to afford easy access to the graves. The whole of the works have been designed by Mr. J. P. Pritchard, of Darlington, who has also superintended the works.

Tamworth.—The parish church of Croxall, near Tamworth, which has been closed for some months for alterations and improvements, has been re-opened for divine service. The old square pews have been replaced by oak benches, carved. A new pulpit, of Mansfield stone, has been placed in the north-east corner, near the chancel arch. The organ has been removed from the west end of the church to a recess specially built for it on the north side of the chancel. Here also are two rows of stalls. A new warming apparatus has been laid by Mr. Mellard, of Rugeley. The other works have been done by Mr. Lilly, of Measham, from plans drawn by Mr. Street, architect, at a cost of about 500*l.*

Kettering.—A new church is being built in the small market-town of Kettering, and the foundation stone has just been laid. The new church will be made to accommodate about 550 persons, and the sittings will be all free and unappropriated. The architect is Mr. Street, and the builders are Messrs. Butlin & Barlow, of Rothwell. The rector gave the site on which the church is to be erected. It will be dedicated to St. Andrew the Apostle.

Welford.—The chancel of this church has been re-opened, after very considerable restoration, and the erection of a window in memory of the late Mr. F. Cox, surgeon, Welford. At the bottom of this window are three subjects,—the raising of the son of the widow of Sarepta by Elijah, the raising of Tabitha by St. Peter, and, between them, the raising of the widow's son at Nain by our Saviour. Above is the crucifixion, between the entombment and the resurrection. The architect employed in the restoration was Mr. Law, and the builder Mr. Gee, of Daventry. The window was by Mr. Usher, of London.

Broadwinsor.—The parish church has been re-opened by the bishop of the diocese. It had been rebuilt by Mr. Charles Hamilton Malan, major in the 75th Regiment, as a memorial of his wife. The restoration has been effected so as to perpetuate the style of the old building. On one side of the church the pillars were Norman, marking the original structure as having been erected about the time of William the Conqueror. On the other side the pillars were Early English. This has been carried out in the restoration. The nave has been lengthened 10 ft., and, with the chancel, has been entirely rebuilt. A heating apparatus has been built beneath the vestry, and the drainage around the church renewed. The north aisle has been enlarged. The west window has been opened up by the insertion of a western arch. The porch of the south entrance has been rebuilt. Mr. John Mountford Allen, of Crewkerne, was the architect of the new building, and the contracts for the masonry and woodwork were undertaken by Mr. Davis, of Langport, and Mr. Charles Trask, of Ham. A new organ by Walker, value 200*l.*, has been obtained by subscription, principally by the efforts of Mrs. Joseph Studley.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Cotton.—The chapel at Cotton, near Oakmoor, has been re-opened, after having been closed upwards of ten years. The church was built from the designs of the late Mr. Pugin, by the last Roman Catholic Earl of Shrewsbury.

Swinnerton.—The foundation-stone of a new church has been laid at Swinnerton, near Stone. It will be built from the designs of Mr. Gilbert Blount, of London, and its cost will exceed 4,000*l.* which will be defrayed by members of the Fitzherbert family. The style will be that of the transition between Early English and Decorated. It will consist of chancel, with aisle, tribune for the family at the hall, sacristies, porch, and belfry. The erection of the building has been undertaken by Mr. Heveningham, of Wolverhampton, builder. The site is close to the hall, and within a stone's throw of the ancient parish church of Swinnerton.

Whitehaven.—The new church of St. Bees, which has been erected on a site near to the coach-road, Whitehaven, has been opened for divine service. The new church has been built from designs by Mr. Welby Pugin, architect, and is a Gothic building of the Decorated period. The whole of the work in connexion with the structure was undertaken by Mr. Cousins of Whitehaven. The church consists of a nave and two aisles, and has a clearstory lighted by eighteen oriel windows. The architect has preserved the ecclesiastical separations, consisting of an apsidal chancel and two lateral chapels, and the whole is so arranged that the altar can as easily be seen from the aisles as from the nave. The east end aisle is terminated by a chapel on the south side, to be dedicated to "Our Blessed Lady," and on the north side by another, to be dedicated to "The Blessed Sacrament." Adjoining the latter there is a vestry, which measures 30 ft. by 20 ft. The church measures 124 ft. long by 61 ft. wide, and is 64 ft. high, or 61 ft. from the level of the floor to the top of the ridge. The exterior is built of white stone walling, with red stone dressings, the former having been obtained from the Walk Mill quarries, and the latter from Mr. Cousins's quarries at Brigham. The pillars and arches in the interior are built of red and white stone, from the same quarries, and the entrance-doorways are lined with alabaster. The roof of the nave and aisles is formed of open-timber work; those of the chancel and side chapels are divided by wooden ribs into panels. Each bay of the nave measures 18 ft. from centre to centre, and is divided by quatrefoil and octagonal columns, formed of varied coloured polished stones. Each division of the aisle is almost entirely filled with one window. The west end measures 108 ft. from the bottom of the steps to the top of the cross of the belfry, which is flanked by two buttresses 56 ft. high. The main gable is filled with three lancet windows, below which is the principal entrance. The roof is covered with pale green and dark blue slates, the former obtained from the slate quarries at Buttermere, and the latter from Wales. Toward the cost of erecting the new church of St. Bees, the first contributor was Mr. Francis Charlton, county surveyor of Northumberland, and the descendant of an old Catholic family, who gave the donation of 1,000*l.* Mr. Dees has provided two windows of stained glass at the east end of the church. The total cost of the structure will be a little over 5,000*l.*, and more than 1,000*l.* yet remain to be given before it is entirely free from encumbrance. It is proposed to convert the old church of St. Joseph—which closely adjoins the new building—into a school to be taught by nuns, for whom a convent near at hand is to be prepared; and to the new church is to be attached a priory for the use of the priesthood.

SCHOOL-BUILDING NEWS.

Saltburn-by-the-Sea.—The foundation-stone of new British schools has been laid at Saltburn, by the Earl of Zetland. The new buildings, when complete, will occupy three sides of a quadrangle, and comprise three school-rooms, with class-rooms attached, affording accommodation for 600 children, and dwelling-houses for the teachers. The style adopted is Gothic. The materials used are red bricks, relieved with white bands and stone dressings. The walls of the school and class-rooms will be lined up to a height of 4 ft. with white glazed tiles, resting on a stone plinth, and finished with an ornamental border and stone capping. Care has been bestowed in the arrangements for heating and ventilation to render them thoroughly efficient. The estimated cost of the buildings is 2,500*l.*; and the works have been let to Messrs. Shaftoe & Barry, of Saltburn. The architect is Mr. John Ross, of Darlington.

Fownhope.—New schools have been opened here. They have been erected through the liberality of Mr. Gwatkin, of Gore House, Twickenham (who, however, does not possess any land in the parish). The master's house has been built by subscription. The structure, which is in the Gothic style, and is built of red sandstone, with Bath stone dressings, has been erected by Mr. William Ford, of Fownhope, from the design of Mr. Nicholson, the diocesan architect. The glazing and painting have been performed by Mr. W. Evans, also of Fownhope.

Great Horton.—The school-rooms, which are being erected in connexion with the Congregational Chapel at Great Horton, and of which the foundation was laid in June last, are now rapidly approaching completion. The contractors are Messrs. B. Illingworth & Son, of Bradford. The school covers an area of 550 superficial yards, and its dimensions are 120 ft. by 41 ft.: the height from the floor of the lower story to the ridge of the roof is 52 ft. The structure is three stories in height on the north-east side, but only two on the front and on the side facing the chapel. The building of the tower with which the school is to be ornamented, has not yet been commenced. The accommodation includes an assembly-room capable of seating 600 people, above which there are sixteen class-rooms; there is also a large lecture-room. The undertaking will cost upwards of 5,000*l.*

Reading, Berks.—It is proposed by the vicar and churchwardens of the parish church of St. Lawrence, Reading, to erect a new infant school, on a plot of ground given by Mr. J. H. Blagrave, of Calcot Park, for that purpose. The cost of the school will be about 700*l.* Messrs. W. & J. T. Brown, of Reading, are the architects, and Mr. Sheppard the builder.

Abingdon.—The foundation-stone of the new Abingdon Free Grammar-school has been laid. The spot which has been selected forms a portion of the ground adjoining Albert Park, an open, dry, and salubrious situation, immediately contiguous to the town. It is near to eligible building-ground, on which residences are already springing up. The school, when built, will be capable of holding forty or fifty boarders, and will be large enough to accommodate one hundred day scholars.

Books Received.

Illustrated Books for Children and Young People. Aunt Mavor's Toy Books, — "The Little Hunchback," "The Enraged Miller," &c. (Routledge); "Puss in Boots" (Routledge); "Every Boy's Annual," "Jack the Conqueror" (Partridge & Co., Paternoster-row); "The Broadway Annual" (Routledge).

When the history of art in connexion with the periodical literature of England comes to be written with that attention to truthful detail which the subject demands, the names of men like Catnach, Hodgson, and several others whose reputation does not at the present time stand high, either in the world of art or letters, must not be forgotten. In their generations, when the days of art were dark in comparison with the present, they did useful service amongst multitudes, and paved the way to those improved conditions which in so many instances afford the means of recreation to large masses of persons.

General education is advancing in Great Britain; but it is unfortunately the case amongst the millions in this country,—and, to a considerable extent, the same may be said of other communities, — that the instruction, which the pencil, aided by the graver and printing-press, can convey, has not been rightly brought into use and made available for a numerous and comparatively uninstructed class,—we mean that important portion of our community who are in the impressible years, when all matters of guidance in good or evil are so marvellous in their effect.

The age of childhood is most important, whether it is in connexion with taste, the practice of art, or those principles which in more matured life lead men and women to be a means of affording pleasure and comfort to those who have reared them, and to others with whom they may have become associated while fighting the battle of life; but it is only those who have taken a deep interest in this most important subject, and watched with care the sure result of right or wrong infant teaching, that can form a just estimate of the consequence of early home and general education.

In many ways there is much to be regretted in the general plans of childhood tuition; but in what is connected with taste and art, the state of affairs is most deplorable. This is to be attributed to various causes, but certainly the want of demand for children's books, particularly those which have a pictorial character, cannot be named as one; for it is probable that in no department of literature has there been such an extensive production of books as in that which caters for the amusement and guidance of very young England. Nor should we complain that there has been altogether a want of contempo-

rary artists of ability and repute who have been willing to devote a portion of their time and talent to the labour of preparing illustrations of those fairy tales and other stories of our childhood, the text of which is not likely to be forgotten while life lasts. The kindly-hearted and earnest George Cruikshanks has done his Jacks and Giants, and embodied in pictorial shape his ideas of personages and circumstances, which formerly filled the "Horn Books," "The Readings Made Easy," and the more recent volumes of rudiments which were often a source of trouble rather than delight. Other worthy labourers in this way might be mentioned; but it seems to us that however good the intention has been in connexion with the artistic displays made in the majority of those books, they failed to develop or improve the taste of young children.

The causes of the want of success in this respect are many and various, but a chief one has hitherto been an idea that the illustrators of children's books should themselves work down to meet the early and undeveloped fancies of childhood, instead of putting before them in the first instance examples of that refinement and beauty which artistic efforts are capable of producing. Messrs. Routledge have made the production of coloured books for little children one of their specialities, the artistic merits of two or three of which we have had to praise. They have just sent out a fresh bundle, some of them named at the head of this notice. "The Little Hunchback" is a marvel for sixpence. The illustrations are artistically drawn and coloured, and full of fun. The same may be said of "The Enraged Miller." In those of "Lost on the Sea Shore," pathos is the prevailing characteristic, successfully conveyed. "Grammar in Rhyme" is another of the series.——"Jack the Conqueror" (not Jack the Giant Killer), by C. E. Bowen (Partridge), is a more important little book, intended for bigger boys and girls, well bound and illustrated, with a number of very good wood-engravings. "Resolve well and persevere" is the advice urged by the story, which has the merit of interesting and entertaining as well as teaching. It is a book we can safely recommend.——"Routledge's Every Boy's Annual," edited by Mr. Edward Routledge, fulfils its title. The volume is full of amusing, with some suggestive, reading, brightly illustrated and smartened up, and will be found acceptable, we have no doubt, by "every boy."——The same publishers issue, under the title, "The Broadway Annual," the numbers of the first series of their *Broadway Magazine*, bound in red and gold, and including a considerable number of engravings. "The Fortunes of a Free Lance," a chivalric romance, runs through and is concluded in the volume.——"The Boy Cavaliers; or, the Siege of Clidesford," by the Rev. H. C. Adams, M.A., is an amusing story of adventure, but carries on the false and injurious notion that all the "Roundheads" were "scum," and all the "Cavaliers" gentlemen.

VARIORUM.

"Cassell's Popular Drawing Copies" are to form four sets, each consisting of twelve sixpenny parts, and headed respectively Floral and Vegetable Forms; Model Drawing; Landscape Drawing; and Figure Drawing. They promise to be useful to a large class.——"The A, B, C Sewage Process." London: E. Stock, Paternoster-row. Second Edition. This pamphlet contains a report of the experiments hitherto made at Leicester, Tottenham, and Leamington, on the purification and utilization of sewage. These experiments seem to have been very successful. The A, B, C process means the process in which animal charcoal, blood, and clay are used; but to these are added alum and perchloride of iron. The result of the experiments is said to show, *inter alia*:—

"1st. The sewage contained 43·02 grains per imperial gallon of organic matter. Of this the A, B, C process precipitated 33·33 grains, leaving only 9·69 grains in the water, and this from an average of fifty samples taken at intervals during the progress of the experiment.

2nd. Hitherto the lime process has been acknowledged to be the best, and the Leicester mode of conducting it to be the best of its kind. The A, B, C contrasts most favourably with this, inasmuch as, from samples taken at the same time from each, the water contained as follows:—

Water from the A, B, C, contained 9·69 grains per imp. gal.
" lime " 16·18 " "

Having precipitated from the sewage the following proportions:—

Organic matter precipitated by the A, B, C, 77·48 per cent.
" " " lime 62·39 "

The phosphates were thrown down in an available form by the A, B, C process only, and the ammonia was by it alone preserved. There were other alleged advantages. Were the question entirely settled, however, in favour of the A, B, C process, and it were brought into use in London and the provincial towns, where is the continuous stream of blood required to come from? Blood is not a mere useless or waste article even now: the poor use much of it for food; but even were it all available we cannot conceive it possible, for example, that all the blood procurable in London would go any great way towards the purification of its sewage. That blood is a precipitator and purifier is well known; it is used, for example, in the manufacture of lump-sugar; and, by the way, we may here give our lady-readers a useful hint. When they have made a "nice cup of tea" and find, notwithstanding, that no fragrant aroma arises as usual from the cup, but, on the contrary, a very unfragrant one, let them at once suspect the sugar. Blood may be a very good purifier of sewage, but it not unfrequently leaves its traces in the purification of sugar. As for the other ingredients of the A, B, C process, it is well known that both clay and charcoal are purifiers; so are alum and perchloride of iron also. The perchloride removes the sulphuretted hydrogen and its notorious odour. On the whole, we admit the efficacy of the ingredients of the A, B, C process, but we fear the compound would not be available in sufficient quantity.

Miscellanea.

The New Meat and Poultry Market, Smithfield.—We understand that the Markets Improvement Committee have definitely fixed the 24th day of November for the opening of the new market. In the absence of the Prince of Wales, the ceremony will be performed by the Lord Mayor.

Slate Houses.—A house has been built at Brownsville, Maine, U.S., which is not only shingled, but is clap-boarded with slate. It is a *slate edifice*—fire-proof, and indestructible. The slates are put on to the boarding of the enclosure with only paper between. They are in the form of segments of a circle, overlapping each other, and have an ornamental effect: no paint is needed. If it were, the slate would furnish it, for when ground it makes an excellent paint, which has been used on a barn with good effect. The front steps are of slabs of slate; the sinks, mantels, and shelves are of slate; the woodwork is brown ash, a native wood, which makes a handsome finish. In short, this is a real State-of-Maine house, and shows the wealth of her resources.

Mediæval German Furniture.—The *Court Circular* has the following:—"In a recent number of the *Builder* there are some very clever sketches of furniture given from objects in the Rathhaus at Ochsenfurth, near Wurzburg. They are accompanied by clearly-written notes, and are a continuation of some previous articles. Speaking of a table, number two among the designs, the writer says,—'This one is a still more remarkable example. Like the former, it is of pine, but retains its old colour and decoration. The hollows are painted crimson with black spots. The slab of this table is ornamented with "zig-zag" pattern, forming a border of inlaid wood. There are no less than eight other ancient tables in the same building; but the two we have selected are the most noticeable. The date of these interesting examples of ancient furniture is unknown; but from the style of the carving and mouldings, there can be little doubt that they are works of the latter part of the fifteenth century.' The moment we saw the sketch we at once recognised this table. If the writer of the article will only take the trouble of going to the British Museum and ask for the print of 'St. Jerome in his Cell,' by Albert Dürer, he will find that a table almost identical with his sketch is drawn there. This print, which is one of the most beautiful works that was ever engraved, has always had a great interest for the lovers of Albert Dürer, because we believe it is well known that this interior, with its quaint and elegant furniture, is a representation of his own studio. It is because of this fact that we call the attention of the writer in the *Builder* to it. As showing how competent a judge he is of the date of old furniture, we may state that the print is dated 1516. This exactly corresponds with his conjecture."

Proposed Roman Catholic Cathedral, Westminster.—According to the *Tablet*, Mr. H. Clutton has been requested to submit plans for the proposed Roman Catholic Cathedral in Westminster.

Practical Service.—Mr. J. D. Botwright, of Bungay, architect, has announced his intention of giving weekly free lessons during the winter season on the illustration of some of the elements of practical geometry, in preparing details and working drawings, and the principles of construction, to the journeymen, apprentices, and others, employed in the building trades.

Art and Industrial Exhibition for Derbyshire.—An Art and Industrial Exhibition is to be held in Derby in the course of a few months. The Duke of Devonshire, lord-lieutenant of the county, will be the president, and most of the nobility in the district and in other counties will be patrons. The Exhibition is intended to be held in the new Rifle Drill Hall now in course of erection, and will consist of paintings, sculpture, and other works of art, lent for the purpose; an exhibition of portraits and works of "Derbyshire worthies;" a collection illustrative of Derbyshire fictile, textile, and other arts; and series of specimens illustrative of the archæology, geology, mineralogy, natural history, and arts and manufactures of the county. It is also intended to hold flower-shows, concerts, &c.

Castings.—The exports of castings from the United Kingdom in the first eight months of this year amounted to 58,846 tons, as compared with 50,224 tons in the corresponding period of 1867, and 55,817 tons in the corresponding period of 1866. The increase in the weight of the castings sent in the first eight months of this year to Russia and British India pretty nearly accounts for the progress observable this year. The value of the castings exported to August 31 this year was 472,753*l*. The weight of the castings exported in the ten years ending 1867, inclusive, was as annexed:—1858, 78,192 tons; 1859, 81,302 tons; 1860, 74,971 tons; 1861, 75,055 tons; 1862, 66,553 tons; 1863, 83,551 tons; 1864, 68,877 tons; 1865, 91,322 tons; 1866, 76,401 tons; and 1867, 80,755 tons. The value of these exports was as annexed:—1858, 822,979*l*.; 1859, 795,819*l*.; 1860, 832,638*l*.; 1861, 702,824*l*.; 1862, 574,142*l*.; 1863, 740,310*l*.; 1864, 670,111*l*.; 1865, 792,581*l*.; 1866, 707,992*l*.; and in 1867, 677,433*l*. It cannot be said, therefore, that this branch of our export trade has made much progress during the last ten years.

A Heavy Casting.—The heaviest casting ever made in the West of England, says the *Western News*, has been run at the Keyham Steam-yard, in the presence of 200 or 300 spectators, most of whom were officers of the navy or of the yards, and their families. For the purpose of the casting, 50 tons of iron had been made perfectly liquid by the intense heat of three furnaces with steam blasts, and a mould had been prepared on the floor of the foundry, covered in securely, and surmounted with heavy weights to prevent the top of the mould being driven off. At each corner of the mould, which was some 20 ft. by 15 ft., was a sort of basin or funnel to conduct the metal into the mould, from which also issued several perpendicular pipes to allow of the escape of the air when the fiery liquid occupied its room. The molten iron was run into four enormous portable iron reservoirs, the largest of which when full contained 15 tons of metal. These vast buckets of liquid iron were skimmed of dross and the sand with which they had been temporarily covered to prevent the cooling of the metal. These four buckets were, by cranes and travellers, raised and shifted to the required heights and spots, one being over each funnel of the mould, and at a given signal four torrents of brightly glowing iron were poured into the mould. When the four currents of metal met in the mould there was a loud report, but the top or roof resisted the force of the explosion, and all went well. There was one hitch, however, which threatened to mar the whole work. Just as the 15-ton bucket full of iron began to discharge its contents, the steam crane by which it was being lifted broke down, and for two or three minutes could not be moved. It started, however, in time to save the whole casting from failure. The work was under the direction of Mr. James Ellis, foreman of the foundry, and was fully successful. It is designed for a bed for a new lathe for the fitting-shop. After this monster casting a smaller one of 6 tons was made in the same building, being part of steam machinery for a steam engine.

DEPUTY SURVEYOR TO THE POLICE.—We mentioned last week the appointment of Mr. Caiger (late deputy surveyor) to the surveyorship of the metropolitan police. We have to add that Mr. John Butler has been promoted to be deputy surveyor.

WATER FOR EDINBURGH.—Edinburgh is about to rival Glasgow in the attainment of a good water supply. The town council has decided upon taking measures for the construction of works for conveying water to the city from St. Mary's Loch, a source believed to equal in some respects the famed Loch Katrine.

BADGERS AND DRAINS.—At Penquite House St. Blazey (Cornwall), some radical defects in the drainage were satisfactorily ascertained to be due to the digging of badgers. Three of these animals were captured, although two showed fight, and were only "dug out" after a severe contest with some dogs, who were pressed into the service.

THE LATE FALL OF WAREHOUSES AT HULL.—The inquiry into the fall of the old sugar-house at Hull, when several persons lost their lives, has been terminated. The jury have returned a verdict of "Accidental death," at the same time recommending that legislative measures should be passed for the supervision of old buildings used as warehouses.

HYDRAULIC JACK.—Mr. T. Armstrong, an ingenious mechanic, has invented a hydraulic jack, which, from experiment, it is said, promises to be of great advantage both on the score of efficiency and economy. By the old system it would require ten men to sling a wagon, &c., weighing 12½ tons, but by means of this invention two men can lift a wagon of the same weight, or a 23-ton gun, with the greatest ease.

PRINTERS' ALMSHOUSES.—At the last council meeting of this corporation a letter was read from the treasurer, announcing that the late Mr. Henry Wright, of Kingston, had bequeathed 2,000*l.* to build the second wing of the above most worthy institution. The collector was requested to endeavour to obtain the remainder of the 1,000 guineas (now being collected) required for erecting the first wing, so that the bequest of the liberal donor may become available for the completion of the almshouses.

THE BURSTING OF WATER-PIPES.—Does water expand on becoming ice? *Scientific Opinion* asks this question, and says,—When a bottle of water is frozen, the bottle is usually burst. Hitherto this has been explained by the assertion that the water on solidifying suddenly expands. M. Barthélemy, one of the professors in the Lyceum of Pau, denies this explanation. In a memoir which he has written on the crystallization of water, he alleges that bursting of the bottle is caused by the disengagement of a large quantity of gas—hitherto in solution—by the water at the moment of its solidification. It is alleged, in support of this, that if a bottle of water be placed outside a window in frosty weather, it will be observed that the rupture takes place at the hottest side, viz., that next the window. Some of our correspondents may have made experiments on this point, and we shall be glad to hear what they have to say to this opinion.

DESTRUCTION OF FIRE-DAMP IN MINES.—Our readers will recollect the suggestion in our pages some time since with the view of destroying fire-damp in mines. We are curious to know whether the following originated in these suggestions; for it is rather remarkable how often some Frenchman *discovers* an invention *after* it has been suggested in the *Builder*, another instance of which we shall have occasion shortly to particularize. A new invention, it is said, by M. Delaunier, of Paris, for destroying fire-damp in mines, has been lately laid before the Academy of Sciences. It consists of a copper conductor, broken at intervals, but joined by very fine gold wire soldered to the copper; the gold wire being surrounded by flowers of sulphur, which ignite easily. By passing strong currents of electricity through the copper wire, the gold wire becomes red hot, and thus ignites the sulphur, which burns any noxious gases which may be present. It will, of course, be understood that the electric current is made to pass through the apparatus before the descent of the miners into the mine. The Academy of Sciences have, it is stated, reported very favourably on M. Delaunier's invention.

HOUSE BUILDING IN BELFAST.—During the past month the plans of upwards of 300 new houses were passed by the surveyor and the improvement committee of the town council. This is the largest number of houses approved of in any month in many years, and it is at the rate of 3,600 new houses in the year.

EXPLOSION AT THE ROCHDALE GAS WORKS.—A workman cautioned another that there was a "back pressure" on a new meter in course of fixture in a part of the works recently built to increase the supply, and the hole was plugged up with a wooden plug. Either forgetting or neglecting the caution, the workman pulled out the plug at the back of the meter, and the gas then passed without obstruction from the gas holder into the purifier, and thus into the building, where a number of workmen, *employés* of Mr. Charles Bigmore, of Stockton, were engaged in painting the purifier. The gas ignited, and a terrible explosion took place. The inside of the building was one volume of flame, and the workmen with difficulty managed to get out alive. Some of them were frightfully burnt. As the building and roof were both fireproof, the flames gradually died out, and the works and the building sustained but little damage.

A PAINTER AND A PICTURE.—Rare works of art have been picked up for a few pounds, worth as many hundreds; but these incidents of picture-dealing rarely come within one's own personal experience. A startling case of good fortune is (says the *Worcester Journal*) a topic of conversation in Worcester. A few weeks ago J. L. Albert, a working painter, residing in the Trinity, saw at a broker's, we believe, a picture, of which he formed a very high opinion. He bought it for five or six pounds, carried it home, cleaned it, and began to persuade himself that he had come into possession of a valuable work. He invited several gentlemen to see it, and his opinion was endorsed by some who are looked upon as judges. By-and-by Mr. Albert had successive offers of 50*l.*, 100*l.*, and 250*l.* for his purchase. He rejected, however, all these overtures of purchase. People from all parts came to see the picture, and he was offered 500*l.* for it. This, too, he rejected. This would have turned the head of some men. The picture is a representation of Christ bearing the cross, and is without doubt very beautifully painted. The figure of one who is scourging our Saviour is a marvellous study, and the work bears strong marks of originality. For Albert's sake, we are glad to learn, says our authority, that he has sold it for 700 guineas. We shall be glad to hear more of this work of art. Who bought it? If the story be true, Albert's canvas has proved even more satisfactory than that of some of our electioneering friends.

NEW MACHINERY FOR CHARGING AND DRAWING GAS RETORTS.—An interesting and successful trial of Messrs. Holden & Best's patent gas retort charging and drawing machine has taken place, at Messrs. Handyside's, Britannia Foundry, Derby. The machine travels on rails from one end of the retort-house to the other, immediately in front of the benches of retorts, and consists of three long wrought-iron rakes, mounted one above another on a moveable carriage; also three long scoops mounted on a similar carriage, and in the same relative position as rakes. These carriages travel on a strong wrought-iron cradle. This cradle also carries the engines and boiler that actuate the machine and propel it along the rails. The action, as described, is exceedingly simple, most of the motions are self-acting, and so precise and regular that one might almost fancy the machine was endowed with intelligence. The usual average time for drawing and charging a bench of nine retorts by manual labour is forty-five minutes; this machine accomplishes the same amount of work leisurely in ten minutes, and has drawn and charged that number in six minutes. In labour the machine dispenses with fifty-four men out of seventy-two. The reduced time necessary to keep open the retort-doors effects a very considerable saving. In dispensing with so many men, the experience of the Alliance Gas Company, Dublin, is said to prove that the machine does its work for something under 9d. per ton, whereas, by manual labour, it used to cost them about 2s. per ton. In a gas work carbonising 1,000 tons per week, at 2s. per ton, this would cost 100*l.*, while with the machine, at 9d. per ton, the cost, it is said, only amounts to 37*l.* 10s., thus saving 62*l.* 10s. per week.

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.—"A Member" requests us to say that the gentleman's name whose drawings he mentioned is CAME, not Carne, as misprinted.

TENDERS.

For rebuilding a warehouse, No. 15, Watling-street, City. Mr. Herbert Ford, architect. Quantities supplied:—

Lawrence & Sons	£2,557	0	0
Meyers & Sons	2,400	0	0
Burton & Moreland	2,402	0	0
Conder	2,313	0	0
Pritchard	2,306	0	0
Ashby & Sons	2,295	0	0
Brown & Robinson	2,263	0	0
Henshaw	2,256	0	0
Brass	2,119	0	0
Webb & Son	2,108	0	0
Piper & Wheeler	2,047	0	0
Crabb & Vaughan (accepted)	1,994	0	0

For alteration and additions to Station Hotel, Acton. Mr. George Billington, architect:—

Mitchell	£148	10	0
Blick & Blick	135	0	0
Cardus	133	10	8

For building five cottages and finishing five carcasses, near North Woolwich Gardens. Messrs. W. & T. Stone, architect:—

Batterley	£1,625	0	0
Davis	1,500	0	0
Clark	1,266	0	0
Perry	1,120	0	0

For repairs, &c., to Nos. 2 and 3, High-street, Broadstairs, for Mr. Chapman. Mr. John R. Collett, architect:—

Hiller	£275	0	0
Blackburn (accepted)	230	0	0

For restoration of Sutton Church, Isle of Ely, Cambs. Mr. Frederick Preedy, architect:—

Freeman, Bros.	£2,531	10	0
Bell & Sons	2,344	0	0
Bennett	2,200	0	0
Bardell & Son (accepted)	2,153	6	6

For restoration of Mickleton Church, Gloucestershire. Mr. Frederick Preedy, architect:—

Espley	£1,972	0	0
Tomes (accepted)	1,620	0	0

For rebuilding chancel and adding vestry to Ellesborough Church, Bucks. Mr. Frederick Preedy, architect:—

Cooper	£1,186	10	0
Haddon	1,100	0	0
Fitkin	1,040	0	0
Holland (accepted)	1,000	0	0

For the erection of villa residence, Nightingale-lane, Clapham. Mr. Wimble, architect:—

Binty	£1,986	0	0
Howard	1,977	0	0
King & Sons	1,890	0	0
Notley	1,850	0	0
Woodward	1,850	0	0
Piper	1,797	0	0
Easton	1,758	0	0
Morter	1,593	0	0

For house at Westcroft-place, Hammersmith. Mr. C. E. Barlow, architect:—

Thomas & Son	£679	0	0
Roy	660	0	0
Howe	645	0	0

For the erection of a minister's house, schoolrooms, &c., in connexion with the Congregational Chapel, Stoke-sub-Hamdon, Ilminster, Somerset. Mr. R. C. Bennett, architect:—

Tucker	£2,077	0	0
Wilton	1,986	0	0
Pudding & Rendall	1,980	0	0
Chapman	1,600	0	0
Staple and Bartlett (accepted)	1,488	0	0

For sewerage extension, Kingston-on-Thames. Mr. C. Slagg, borough engineer:—

Wigmore	£2,349	0	0
Morton	2,325	0	0
Walker	2,316	0	0
Wells	2,145	0	0
Harris	2,090	0	0
Robinson	2,090	0	0
Voss	2,032	0	0
Neave & Fry	1,975	0	0
Blackmore	1,900	0	0
Bugbird	1,888	0	0
Hayward	1,875	0	0
Burgess	1,610	0	0
Bellamy	1,600	0	0
Cole	1,598	0	0
Young	1,559	0	0
Bloomfield	1,512	0	0
Potter	1,460	0	0
Killingbeck	1,441	0	0
Floyd	1,400	0	0
Nicholson	1,398	0	0
Ossenton & Carter	1,385	0	0
Hubbard	1,381	0	0
Jackson (accepted)	1,350	0	0
Rumble	1,315	0	0
Freyne	1,249	0	0
Irons & Porter	1,210	0	0

Accepted for alterations to the Harp public-house, New Church-street, Lisson-grove, for W. J. Simpkins. Messrs. Mayhew & Calder, architects:—

General Contract.

Curtis	£246	0	0

Gas.

Comyn, Ching, & Co.	32	15	0

Revolving Shutters.

Clark & Co.	29	0	0

For restoration of premises, Crown-street, Finsbury. Mr. T. W. Iron, architect:—

Henshaw	£394	0	0
Goodman	385	0	0
H. & J. Johnston	329	0	0
Wicks, Bangs, & Co.	320	0	0
Merrett & Ashby	313	0	0

TO CORRESPONDENTS.

A Draughtsman (power of the Board would depend on circumstances. Look to the Act).—R. V.—J. St. A.—C. S.—C. R.—F. P.—C. & V.—A. G. S.—F. T. P.—J. H.—H. M. S.—R. H. D.—B. L.—W. & Co.—P. A.—H. E.—T. G.—G. H. T.—B. J.—J. G.—H. F.—H.—H. T.—G. R.—J. W.—T. T.—H. W. T.—J. W. P.—H. B.—F. W.—H. P.—P. C.—W. C. T.—J. C.—C. J.—J. R. C.—A Subscriber.—M. W.—A. M.—J. P.—W. S.

Country newspapers should be marked.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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